NATIONAL PETROLEUM NEWS

Vol. XVIII Cleveland, Ohio, December 15, 1926 No. 50

Methods to Curtail Overproduction To be Worked Out by Institute

By V. B. Guthrie
N. P. N. Managing Editor

TULSA, Dec. 13

THE American Petroleum Institute, on behalf of the entire oil industry, has squarely met the challenge of the Federal Oil Conservation Board to find some means itself to curtail overproduction of crude, or else be prepared to have government agencies take this step.

At its seventh annual convention at Tulsa, Dec. 7, 8 and 9, the Institute set the machinery going to (1) prevent the waste of gas in oil producing fields, and (2) to draft model laws for either state or federal enactment allowing agreements among oil companies to curtail production when there is an over supply of oil.

The specific resolutions by which this was accomplished are: (1) "Resolved, that we endorse the conclusion of the Federal Oil Conservation Board in its report of September, 1926, that the prevention of the waste of gas incident to the production of oil is of paramount importance in the conservation and economical production of oil, and the president of the institute is requested to appoint a committee of seven to devise and suggest to this board, or the executive committee, such measures as will enable the industry, while continuing to meet the consumption requirements for petroleum and its products, to conserve in its natural state such reserves of petroleum as may not then be required for consumption."

(2) "Resolved that the president of the institute appoint a committee of seven to formulate and recommend to this board, or its executive committee, at the earliest practicable date a program of legislation, federal and state, to be advocated by the institute, giving sanction and effect to agreements by oil producers for the curtailment of production in pools where and during periods when there is over-production, having for their purpose the economical and orderly production of oil."

A Milestone in Industry

IN thus setting to work, as an industry, to remove legal barriers and provide means to hold back the production of oil from the ground to somewhere near current consumption, the institute is taking a step which marks a milestone in industrial history in this country.

It is impossible to set down in cold type the importance of this action of the board of directors of the institute, —provided of course their plans carry through—or to express the effect it may have on future operations of the industry, or on its price structure.

In short it asks sanction to set aside the law of supply and demand as the fundamental regulatory force in the oil industry and substitute an artificial force to apply against an over-production of crude; for both measures the institute is taking—at the suggestion of the federal oil board—work to the same end, the limiting of production of crude.

Probably not one man who attended the institute convention would have dreamed at its start that that organization would go on record as asking legislation affecting the oil business. It was quickly seen, however, that consideration of the oil board's report was the main issue of the meeting. When the institute directors' course was announced, many felt the institute had weathered a critical period and that, as a result, it will be a more potent force within the industry than it has been before.

Important papers delivered at the institute meeting at Tulsa and articles by National Petroleum News staff writers on happenings there are to be found in this issue starting on Page 28 and continuing through a good part of this issue.

Two Days' Discussion

THE adoption of this course of action by the institute directors was not all smooth sailing, however. The board spent two days on its consideration. Practically every member present experienced in production matters took an active part in the discussion. The center of attention the last two days of the institute convention was the door leading from the mezzanine floor of the hotel to the room where the board was in session.

Through it hurried secretaries and experts on production matters called to appear before the board. On guard against interruptions stood a member of the institute staff. Outside newspapermen fidgeted.

By a coincidence, the first board member to leave when the final session was through was H. L. Doherty, at the head of extensive oil, gas and public utility interests, who, some three years ago, provoked considerable criticism from other board members by proposing a so-called unit plan of developing oil pools in the interest of conservation. In principle, but not in plan of operation, the work now being launched by the institute is what Mr. Doherty then advocated.

"This is about the first time I ever left an institute board meeting feeling like holding my head up," said

Mr. Doherty, on his way to catch a train.

When conditions are analyzed it is not particularly difficult to understand why these board members, all practical oil men and heads of big companies, should have changed their point of view on the matter of conservation of our oil resources. For one thing, the entire industry has advanced tremendously in its technical knowledge concerning oil production.

It now knows that practical methods are at hand for doing some of the things that it was thought, even three years ago, could hardly be considered because the practical methods were lacking. Or, if they are not actually at hand, such improvements have been made in oil production methods, that it is reasonably certain they can be brought out to fit the needs of specific problems.

Again, there is undoubtedly a stronger public feeling towards some degree of conservation of petroleum resources than was the case a few years ago. The public knows more about the oil industry in general now than it did then. Men in the oil industry know more about the workings of other branches of the industry. The present administration at Washington recognized an increasing feeling on the part of the public for economy in the use of petroleum resources.

The work of the Oil Conservation Board itself has increased general discussion outside and inside the industry on the subject of conservation. The board's report itself was far more practical in its recommendations as to conservation than many anticipated. If it had been a theoretical treatise on conservation, instead of practical, the institute and the public as well would have soon forgotten about it. Being practical and definite in its recommendations, it virtually stood as a challenge to the oil industry to take some action in regard to it.

Marland Recalls Statement

BOARD members attending the Tulsa convention had read the article on the subject of the institute's attitude towards the report by M. L. Requa, head of the oil division of the fuel administration during the war, as published in the Dec. 1 issue of National Petroleum News. The first morning of the convention E. W. Marland, president of the Marland Oil Co., asked to appear at the afternoon general session to speak on the subject of conservation; although he was not scheduled on the program. At the same time he issued to newspaper and oil journal men the statement he intended to read at that meeting.

It became known that Mr. Marland was to propose that the institute membership generally pass a resolution asking the legislature in Oklahoma and other oil producing states to enact laws for the conservation of gas. He went on to say that a law to prevent the waste of gas in connection with the production of oil would curtail oil production to the point supply would about equal demand, and the producer could get a price for his oil that would allow him to operate at a profit. At the same time he said he saw no necessity for this increasing the price of refined products to the public to any great extent, because of extravagance in the methods of distribution of those products.

Mr. Marland did not appear as a speaker and his statement was recalled before it appeared in print. However, the subject of the institute's attitude towards the oil board's report and conservation in general was formally before the institute. At first it was thought that a second general session of the institute might be called for the afternoon of the last day. This was soon dropped as impractical and the next noon the board of directors convened to thrash out the matter.

Two Points Before Board

IT was decided that two suggestions in the oil board report needed the chief attention of the oil industry. One recommended legislation to stop the waste of gas in oil pools and the second advised legislation which would remove oil companies working out cooperative agreements to develop oil pools and thereby hold back the production if not needed from danger of prosecution under anti-trust laws. The board decided to take up the second suggestion first.

Judge A. L. Beaty, chairman of the board of The Texas Co., introduced a resolution for the board to consider. The suggestion was made that a model law be drafted and its passage be urged in Oklahoma so that its working could be watched. This suggestion was dropped in favor of another that a special committee be appointed to give the matter more study and devise a suitable program of legislation. The resolution, as it was finally drawn, was amended at the last moment to carry the statement that the purpose of the cooperative holding back of production when it was not needed was for the "purpose of economical and orderly production of oil."

The membership of the Committee on Agreement, as it is called, is: Judge Beaty, chairman; J. A. Veasey, Carter Oil Co., Tulsa; C. B. Ames, counsel for The Texas Co., Oklahoma City; John C. Townes, Humble Oil & Refining Co., Houston; A. C. Weil, General Petroleum Corp., San Francisco; Axtell J. Byles, Tide Water Oil Co., New York, and F. C. Proctor, counsel for the Gulf Production Co., Houston. All the members are lawyers.

The greater part of the debate by the board was on the question of eliminating waste of gas where it is incident to the production of oil. Mr. Marland and Mr. Doherty, and W. C. Franklin, vice-president of the Tidal Oil Co., were leaders in the discussion. Mr. Marland pointed out that the waste of gas was three-fold, that of the gas itself, the gasoline content of that gas and the oil which might be eventually taken from the pool were the gas pressure to be maintained on the sand.

Second Committee of Seven

IT was finally decided to handle this matter by a committee of seven also. The following were named on this committee: Mr. Marland, chairman; S. H. Keoughan, Continental Oil Co., Denver; Henry McGraw, Gypsy Oil Co., Tulsa; W. S. Farish, Humble Oil & Refining Co., Houston; J. Edgar Pew, Sun Oil Co., Dallas; L. P. St. Clair, Union Oil Co. of California, Los Angeles; and T. A. O'Donnell, California Petroleum Corp., Los Angeles. The degree of importance in which the board holds this committee is to be seen in the fact it includes the three past presidents of the institute.

While the consideration of conservation was over-shadowing in its importance, the Tulsa convention would have gone onto the record as the most important the institute has yet held if this subject had been entirely omitted. Interest in the technical sessions on the various subjects was greater than ever before, as attendance at them showed. The papers presented were better prepared and were easily more important as contributions to oil industry technical arts than before.

In point of view of attendance generally the Tulsa convention broke all records. More than 2100 were registered and there were many Tulsans who took part in the meetings who did not take the time to register officially.

Coming Meetings

Nebraska Independent Oil Men's Association, Hotel Fontennelle, Omaha, Dec. 15, 16.

Kansas Oil Men's Association, Topeka, Kan., Dec. 17.

South Dakota Independent Oil Jobbers Association, Carpenter Hotel, Sioux Falls, S. D., Jan. 4, 5.

Wisconsin Independent Oil Jobbers Association, Hotel Pfister, Milwaukee, Jan. 10, 11, 12.

Iowa Independent Oil Men's Association, Fort Des Moines Hotel, Des Moines, Ia., Feb. 2, 3.

North Dakota Petroleum Association, Fargo, N. D. Feb. 3, 4.

Michigan Independent Oil Men's Association, Detroit, Feb. 10 and 11.

Ohio Petroleum Marketers Association, Neil House, Columbus, O., Feb. 17, 18.

American Oil Men's Association, Congress Hotel, Chicago, March 22, 23, 24.

American Oil Burner Association, Broadway Auditorium, Buffalo, N. Y., Apr. 5, 6, 7.

Index to This Week's News

National Petroleum News

General

Institute to Find Means to Meet Conservation Issue.....*By V. B. Guthrie* 17
Prairie to Furnish Crude to Lubrite Refining Co.....*By A. F. Hinton* 21
Doheny Pleads Patriotism 27

A. P. I. Annual Meeting

E. W. Clark Made President of Institute.....*By William E. Green* 22
Chronicle of the "Wildcat Special"..... 25
Discussion Shows Need of Anti-Knock Testing Method.....*By Paul Truesdell* 28
Effects of Corrosion on Oil Tanks.....*By L. G. E. Bignell* 30
New Methods of Applying Foam to Tank Fires.....*By H. H. Hall* 48-A
This Year's Dscoveries May Widen Producing Areas.....*By Paul Wagner* 48-E
Institute Asked to Organize Oil Technology Work..... 48-J
Uniform General Balance Sheet Approved by A. P. I..... 48-K
Motor Transport Division to Study Truck Practice..... 48-L
Describes Oil-Gas-Powdered Coke Burner.....*By Paul Truesdell* 48-M
Institute Asked to Wage War on Corrosion.....*By Lawrence E. Smith* 48-O
Problems of Refining Panhandle Crude Being Met.....*By Walter Miller* 48-P
Conclusions Drawn from Two Lightning Fires.....*By Ralph J. Reed* 57
Care Needed to Keep Up Oil Field Boilers.....*By John R. Suman* 59

Production

Crude Production Again Near Peak.....*By Roger B. Stafford* 72
Relationship of Geology to Rocky Mountain Development.....*By Ralph Arnold* 89
Individual Compressors Part of Gas Lift System.....*By Lawrence E. Smith* 92
Our Industry—Facts and Observations.....*By Paul Wagner* 94

Refining & Natural Gasoline

Oils Go Off Color When Treating Acid Contains Nitrogen...*By F. N. Williams* 63
Ethyl Gas Introduced in California..... 96
Visiting Around the Refineries.....*By Paul Truesdell* 100

Marketing

Tennessee Inspection Law Fortified by Tax.....*By Ward K. Halbert* 69
Physician Drives 110 Miles to Get Car Greased.....*By Roger B. Stafford* 84

Departments

New Equipment for Plant Improvement..... 99
Here and There..... 102
New Oil Station Construction..... 104
Oil Patents 106
On The Lazy Bench..... 109

Market Section

Refinery Price Tables.....115-117
Tank Wagon Price Tables..... 119
Complete Export Markets.....120-121
Crude Oil Prices, All Fields..... 122
Refiners' and Compounders' Supply Prices.... 123

National Petroleum News is copyrighted, 1926, by the National Petroleum Publishing Co. Single copies, 10 cents. Subscription rate $2.50 per year in the United States and Mexico (U. S. Money), $3.50 in Canada and $5.00 in all foreign countries. Trademark registered U. S. Patent Office. Members of Audit Bureau of Circulations and Associated Business Papers, Inc.

Published at MAIN OFFICE Cleveland, Ohio
812 Huron Road

TULSA Bank of Commerce Bldg.
NEW YORK 342 Madison Ave.
LOS ANGELES Petroleum Securities Building
HOUSTON 608 West Bldg.
CHICAGO 360 North Michigan Ave.

Oklahoma City Test May Drill Deeper

(By Telegraph)

TULSA, Dec. 13.—Wildcat test of J. I. Cromwell and others about two miles north of Oklahoma City is now reported to have about 2000 feet of oil in the hole, the water having been successfully shut off. It will be bailed down today and if there is no increase in oil it will be drilled deeper. Yesterday it was cleaned out 16 feet to the bottom and made one or two flows while being agitated. No gas is present. Geologists express the opinion it may be in the Layton horizon at its present depth of 4383 feet. Oil from well is reported as 34 gravity black.

The Searight field, north of Seminole, apparently is cut off to the northwest by a Amerada well about one mile ahead of production. This well, known as No. 1 Baker, and located in SE NW of 28-10-6, has a hole full of water at the base of the Hunton lime from 4,225 to 4,317 feet. At this depth, which is about where the Wilcox sand is found in Searight, the well is running approximately 200 feet low on structure.

Papers Urging Dealers To Stock Iso-Vis

CLEVELAND, Dec. 14.—One way in which the Standard Oil Co. of Indiana is putting over its new motor oil ISO-VIS is to have the newspapers in which it advertises the oil write all dealers and urge them to stock the oil. Competing oil companies are protesting vigorously to these papers.

The Dubuque Times-Journal of Dubuque, Ia., on Dec. 6 sent the following letter to dealers in its territory,—

"A huge advertising campaign on ISO-VIS, the wonderful new motor oil, has just been ordered published in the Dubuque Times-Journal by the Standard Oil Co.

"The size of this campaign will without question create a tremendous demand for ISO-VIS and we suggest that you have enough of it on hand to at least meet this demand.

"ISO-VIS MUST have the 'stuff,' or else the Standard Oil Co. would not spend such tremendous sums advertising it—and when customers ask YOU for ISO-VIS, naturally you will want to have it on hand." It is understood that the other large daily in Dubuque refused to send out such a letter.

L. F. Kuehnle, president of the Leader Oil Co. of Dubuque, and himself a good advertiser in this same newspaper in protesting to the publisher, said:

"This is the first time in all our business experience we have ever known of a reputable newspaper endorsing over their own signature a product that they know absolutely nothing about, or of a reputable newspaper mailing out similar propaganda. We feel and believe that in doing this you have gone far beyond good newspaper business ethics or practice. It appears to us as a plain case of 'buying the press' with a huge advertising appropriation and God help us if this condition ever becomes general."

Standard Asphalt Wins Culmer Patent Suit

CLEVELAND, Dec. 14.—Reports from Chicago are that the United States circuit court for the seventh circuit has just confirmed the award of the lower court in favor of the Standard Asphalt & Rubber Co. against the Barber Asphalt Paving Co., subsidiary of the General Asphalt Co. The Standard is awarded damages in excess of $850,000.

Suit involved claims by the Standard Asphalt for infringement of the Culmer patents covering air-blown asphalt. The suit has been bitterly fought for about 14 years. In the meantime, the patents have expired. The recovery is for profits and damages prior to expiration of the patents.

The Standard Asphalt & Rubber Co. was controlled by the same interests that own the Universal Oil Products Co., licensors of the Dubbs cracking process. According to the Universal Oil Products Co., the decree entered in the Standard Asphalt suit is final and suits on the same patents are still pending against The Texas Co., Standard Oil Co. of New Jersey and several of the larger manufacturers of asphalt products.

Pipe Lines Consolidated

WICHITA FALLS, Dec. 11.—The Wichita Pipe Line Co., jointly owned by a group of Independent refiners of the Wichita Falls district, has taken over the pipe lines of the American Refining Co. and the Panhandle Refining Co. Capitalization of the company, which will be styled the Wichita Pipe Line Co. of Wichita Falls, was increased to $1,000,000. With the consolidation the company will have in operation about 390 miles of lines in Archer, Jack, Wichita and Young counties, capable of handling 25,000 barrels of oil daily.

South Texas Wildcat Makes 100 Bbls.

TULSA, Dec. 11.—Lockhart & Co.'s well on the Allen lease in Loving county, 26 miles north of Pecos near Pecos river, was producing last Saturday at the rate of 100 barrels of 40 gravity oil at 4342 feet after a small shot. The oil is standing 3000 feet in the hole. A string of 6⅝ inch was landed at 3970 feet and there is no tubing in the hole. This well is located on an 8000-acre tract. Lockhart & Co. is the Texas operating subsidiary of the Rio Grande Oil Co.

Refinery Superintendents To Meet Jan. 17-18

TULSA, Dec. 13.—Operating problems of refiners will be discussed in detail at a special meeting of operating heads and superintendents of Mid-Continent plants at Wichita Falls Jan. 17 and 18. The meeting will be held under the auspices of the manufacturers committee of the Western Petroleum Refiners Association.

H. W. Camp, general superintendent for the Empire Refineries, Inc., is in charge of the program. Subjects to be discussed will include treatment of cracked gasoline, contact filtering of lubricating oils, operation of bubble cap towers, fuel economy at refineries, vapor recovery systems to reduce evaporation losses and revivication of Fullers earth. Papers will be prepared on each of the above subjects by men who have made special studies of the problems. In addition one general paper will be presented.

Announcement of the complete program of the meeting will be made within the next two or three weeks. Thus far not all of the subjects have been assigned. Meetings will be held at the Kemp hotel. A feature of the meeting will be an inspection trip through Wichita Falls refineries.

The manufacturers committee of the Western Petroleum Refiners Association held a similar meeting last spring at Ponca City. The operators visited the Empire plant and the Marland plant at which the company had just completed a four million dollar improvement campaign. At that time the operators voted to hold similar meetings at different points several times each year.

Oil Companies To Lose Huge Refund Claims

WASHINGTON, Dec. 13.—The Interstate Commerce Commission today denied the petition of Standard Oil Co. of Indiana for re-argument and re-consideration in its two formal complaints on rates charged on petroleum shipments made between Nov. 27, 1920 and Nov. 1, 1923, from Wood River, Neodesha, Wichita, Sugar Creek, Cushing, Okmulgee, Sapulpa, Tulsa and Casper, to points in Illinois, Michigan, Ohio, and Missouri.

That means that neither the Standard nor any other oil shipper will get any part of the large sum, estimated from 4 to 20 millions, which they claim railroads owe them as refunds, because they violated their tariffs. The denial practically throws dozens of other oil cases out of court.

Tank Wagon Changes

DALLAS, Dec. 13.—Magnolia Petroleum Co. on Dec. 10 reduced tank wagon and service station prices of gasoline 2 cents, both to 15 cents.

Prairie to Supply Independent Refinery At St. Louis With Crude Oil

By A. F. Hinton
N. P. N. Staff Writer

TULSA, Dec. 14

PRAIRIE OIL & GAS CO. has contracted with the Lubrite Refining Co. to deliver pipe line crude to the latter's refinery near St. Louis. Deliveries are to begin early in January.

The amount of crude to be taken from the pipe line by the Lubrite plant is not stipulated in the contract, it is understood, but the plant is to take its requirements in daily deliveries. The amount delivered will probably average 3500 barrels daily at the start. In order to make delivery, Prairie Pipe Line Co. is constructing 22 miles of 6-inch line to the plant from its main line connection.

Refiners in the Mid-Continent profess to see in this announcement from the Prairie a willingness to serve Independent plants in this territory generally. They point out that the big eastern seaboard plants are taking less crude from the Prairie than before and that the Standard Oil Co. of New Jersey, formerly the Prairie's biggest customer, is working out plans which will make it virtually independent of this source of crude in the Mid-Continent field.

They believe that the small and large refineries scattered through the Mid-Continent territory, most of them within access of the Prairie's pipe line system, are the logical customers for its crude. They also believe that supplying crude by the Prairie to the Mid-Continent plants would be the greatest possible stabilizing force to the Mid-Continent refinery markets, if the arrangements between the Prairie and the refineries were flexible to the extent the refining plant could govern its crude runs by approximately the market demand for refined products.

Relief From Premiums

THE refineries, on their part, would be relieved of the necessity of paying premiums in times of scarcity of crude and would not be forced to take the crude when they did not need it for fear of losing their connections, as is now sometimes the case.

The pipe line tariff schedules filed with the Interstate Commerce Commission provide for the pipe line company supplying crude oil on demand under certain provisions, one being that the minimum delivery must be 100,000 barrels. Occasionally, in times past, when Independent plants called on the Prairie for crude, the Prairie has shown, under these conditions, how it could not reasonably supply the plant. The 100,000-barrel minimum delivery has been set aside, in a court case, as far as certain pipe line stations in Pennsylvania are concerned, and it is believed that an order could be easily secured, setting it aside in the case of other plants, if that was necessary.

Some Mid-Continent refiners believe, though, that this point and other conditions that have been set up by the Prairie in the past, will be put aside in the future and that the Prairie will show an increasing willingness to sell and deliver its crude oil to the refining plants located in the territory where the oil is produced, under terms which will make it advantageous to the plants to take crude from the Prairie.

The Lubrite plant will be the third refinery buying crude from the Prairie in the Wood River area, this point being a terminal of the Prairie Pipe Line Co. for its main line branches, one line going eastward across Illinois and the other northward toward Chicago. The two other refineries already being supplied with crude are the Standard Oil Co. of Indiana and the White Star Refining Co., an Independent plant. The latter has been getting about 2500 barrels daily for about two years.

While details of the Prairie-Lubrite contract are not available for publication, it is stated that the crude will be delivered at the same price charged all other of the company's customers, this being the regular posted price plus gathering and carrying charges. The refinery is not required to take a stated amount of crude daily, it is said, but will take what it needs to run through its stills.

This appears to be a highly satisfactory arrangement for a refinery situated as the Lubrite plant is, remote from production, and heretofore forced to go into the crude market, usually pay premiums for crude, and then ship it by tank cars to the plant. Under the new arrangement, it will be assured of a steady daily supply of average-gravity Mid-Continent crude, and as much of it as it needs.

High Gravity Crude in Less Demand

WITH the steady spread of cracking processes in refining, the premium heretofore placed upon high-gravity crudes as compared with the lower grades is disappearing, and recent determination of actual differences in value have indicated the trend toward a shrinkage between market values of the upper and lower crude grades. For this reason, refiners who formerly wanted only high-gasoline-content crude, for use in skimming plants, now are able to use heavier crudes.

In obtaining oil from the Prairie's pipe line, they could get crude now running from 36 to 37° gravity. Production in Oklahoma at present averages better than 38° A.P.I. gravity, but the Prairie buys much oil from old, shallow, settled-production properties where low-gravity crude is produced, and this brings down the average of its pipe line stream. However, the present pipe-line average gravity is probably three degrees higher than it was four years ago, when the gravity-basis of crude-buying was adopted.

As far as is known, the Lubrite will be the fifth Independent refinery to which the Prairie Oil & Gas Co. sells crude. About two years ago, it began to sell to The Texas Co. at Lockport, Ill., and at about the same time agreed to sell about 2500 barrels of crude daily to the White Star Refining Co., near St. Louis. It is also said to be selling crude to the Sun Oil Co. at Toledo, O. The Prairie is also selling crude to McCall Brothers, Toronto, the crude being taken from the pipe line at the Buffalo plant of the Standard of New York and hauled to Toronto by barge and tanker.

During November, shipments of the Prairie Pipe Line Co. were 4,082,008 barrels, or 136,067 barrels a day. The highest figure attained this year was 145,407 barrels daily, during February. These compare with the peak of 190,705 barrels a day, reached in September, 1922. During 1923, when California overproduction flooded the market, Prairie shipments went down to 80,600 barrels a day in October, and during all of 1924, they averaged only 117,000 barrels a day.

Mid-Continent Officials Chosen

TULSA, Dec. 11.—Directors of the Mid-Continent Oil & Gas Association met Dec. 7 and re-elected all officers who served during the past year. William N. Davis, of Bartlesville, enters upon another term as president. Harry H. Smith is secretary and treasurer and three vice presidents were re-elected, as follows: W. B. Pyron, Gulf Production Co., Houston; Burt H. Collins, Echo Oil Co., Tulsa; Clyde M. Bennett, Louisiana Oil Refining Corp., Shreveport. Each vice-president represents a division of the parent association.

New Institute Head Brings to Office 25 Years' Experience as Producer

By William E. Green
N. P. N. Staff Writer

TULSA, Dec. 11

"I AM happy. I have been honored by the greatest body of men in the world—the American Petroleum Institute." Thus spoke C. W. Clark, executive vice president of the Union Oil Co. of California, as he stepped from the committee room at the Mayo Thursday afternoon following the session of the Board of Directors, at which he had been elevated from his position of vice president of the Institute to that of president.

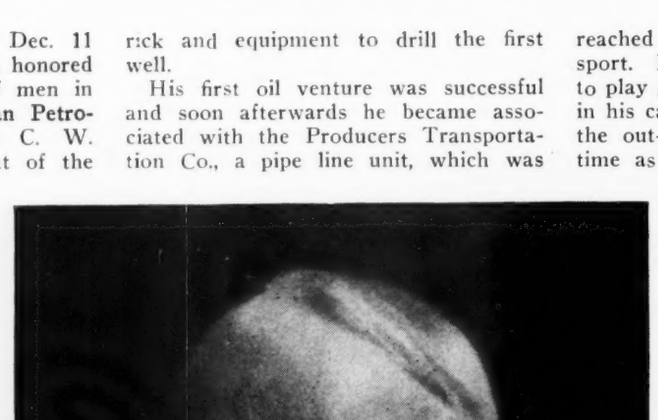
When the American Petroleum Institute was first organized, it came to the West Coast for its first president. Thomas A. O'Donnell of the California Petroleum Corp., was thus the first oil man to be honored with the highest office in the gift of the American oil men. He was so well loved and respected that he was forced to serve four times. Then J. Edgar Pew of Dallas was honored. At the following convention W. S. Farish was elected for the term that ended with the annual meeting just held in Tulsa. Therefore, California was called upon to furnish the fourth president of the Institute.

The selection of Mr. Clark apparently met with the hearty approval of those attending the Tulsa meeting. Mr. Clark was showered with congratulations and promises of support from all quarters, until he hardly had time to prepare for his departure Thursday night with other officials of the Union Oil Co. for a tour of company properties in Colorado enroute to Los Angeles and home.

MR. Clark has been actively engaged in the oil business in California for the past 25 years. He and his associates drilled their first well in the old Santa Maria field, and by the way, this well is now owned by the Union Oil Co. and still producing.

Mr. Clark was with the Pacific Coast Steamship and Railway Co. in California when he became interested in the possibilities of the oil business, serving the transportation company as vice president and general manager. He and associates drilled their first well in 1901, and top heavy mortgage entered into the deal for the purchase of a derrick and equipment to drill the first well.

His first oil venture was successful and soon afterwards he became associated with the Producers Transportation Co., a pipe line unit, which was later taken over by the Union Oil Co. His first position with the Union was as manager of transportation and later as vice president and general manager. Some six years ago Mr. Clark was elected executive vice president, the position he still holds.



The new president of the American Petroleum Institute, E. W. Clark, executive vice president of the Union Oil Co. of California

Served on Fuel Administration

DURING the war Mr. Clark was a member of the fuel administration, traveling over the country in handling his patriotic duties, thus becoming for the first time well know on the East Coast. His friends in other sections of the oil world since that time have shown an annual increase in numbers about on a par with the annual increase in crude oil production.

No, Mr. Clark is not a golf player. He seems to think that he has not reached the proper age to take up this sport. But he makes up for his failure to play golf by riding all over California in his car with the top down. He loves the out-of-doors, and spends as much time as his duties will permit visiting the fields. If he has a hobby, it would be finding a virgin piece of land where indications are sufficiently good to justify the drilling of a wildcat. He takes a keen interest in humanity and in the welfare of the employes of the Union. His office door is open and he feels complimented when the Union employes come to him with their troubles.

Mr. Clark has a host of friends in California, not confined to associates in his company, and they rejoice with him in the honor paid him by the oil men of the country. They feel that in honoring Mr. Clark, the oil fraternity of California has been honored.

Why mention ages among oil men? But it might not be amiss to say that Mr. Clark is slightly more than 65 years of age, but less than 70.

L. L. Marcell, president of the White Eagle Oil & Refining Co., Kansas City, was elected vice-president for the manufacturing branch of the industry to succeed Mr. Clark. W. N. Davis of Bartlesville, president of the Mid-Continent Oil & Gas Association, was re-elected vice president of the Institute representing the producing branch, and R. D. Benson, Tide Water Oil Co., New York, was re-elected vice president for the distributing branch.

Amos L. Beaty, The Texas Co., New York, was re-elected treasurer, and Lacey Walker of the Institute staff was re-elected assistant treasurer. Both R. L. Welch, general secretary and counsel, and W. R. Boyd, Jr., his assistant, were re-elected.

The executive committee for the new year will be composed of the five officers and the retiring president as ex-officio members, and R. W. Stewart, Standard Oil Co. of Indiana, Chicago; George S. Davison, Gulf Oil Corp., Pittsburgh; J. Edgar Pew, Sun Oil Co., Dallas; H. L. Doherty, H. L. Doherty & Co., New York; W. C. Teagle, Standard Oil Co. of New Jersey, New York; and

E. W. Marland, Marland Oil Co., Ponca City.

By-laws of the Institute were amended to increase the number of directors from 53 to 60. The seven new places on the board will be elected directly by the board itself rather than by the board on nomination of the board of councillors as is the custom with all other members. The seven new places will be in the "at large" group, not being assigned to any particular division of the industry or any geographical grouping.

Three of the seven men named by the board were members of the board last year who were not nominated by the board of councillors at its meeting on the first day of the convention. They were, L. V. Nicholas, president of the National Petroleum Marketers Association, Chicago; W. S. Fitzpatrick, Prairie Oil & Gas Co., Independence, Kan., and D. M. Folsom, General Petroleum Corp., San Francisco. The four new members placed on the board as a result of the action were, E. R. Brown, Magnolia Petroleum Co., Dallas; H. M. Dawes, Pure Oil Co., Chicago; Taylor Alderdice, National Tube Co., Washington, D. C., and John H. Markham, Jr., Independent producer, Tulsa.

Following is the complete board of directors of the Institute for the coming year. Those marked with an asterisk were re-elected and those marked with two asterisks are new members.

Production Group

Pacific Coast Group—*L. P. St. Clair, Independent Oil Prod. Agency, Los Angeles; *F. H. Hillman, Standard Oil Co. of California, San Francisco; *Dave S. Ewing, Ethel D. Co., San Francisco; Mark L. Requa, San Francisco.

Rocky Mountain Group—B. B. Brooks, Consolidated Royalty Oil Co., Casper, Wyo.

Central United States Group—*W. S. Farish, Humble Oil & Refining Co., Houston; J. D. Collett, O'Keefe & Collett, Fort Worth; J. Edgar Pew, Sun Oil Co., Dallas; Frank Phillips, Phillips Petroleum Co., Bartlesville; W. C. Franklin, Tidal Oil Co., Tulsa.

Eastern United States Group—**Arthur F. Corwin, Standard Oil Co. of New York, New York; J. C. Donnell, Ohio Oil Co., Findlay, Ohio.

Manufacturing Group

Pacific Coast Group—*H. R. Gallagher, Shell Co. of Calif., San Francisco; E. W. Clark, Union Oil Co., Los Angeles.

Rocky Mountain Group—T. A. Dines, Midwest Refining Co., Denver.

Central United States Group—*Roy B. Jones, Panhandle Refining Co., Wichita Falls; F. A. Pielsticker, Skelly Oil Co., El Dorado, Kan.; P. M. Miskell, Empire Refineries, Inc., Tulsa.

Eastern United States Group—**Frank B. Fretter, National Refining Co., Cleveland; *R. D. Benson, New York; *Edward Prizer, Vacuum Oil Co., New York; Charles L. Suhr, Pennzoil Co., Oil City, Pa.

Distribution Group

Pacific Coast Group—*K. R. Kingsbury, Standard Oil Co. of California, San Francisco.

Rocky Mountain Group—E. T. Wilson, Continental Oil Co., Denver.

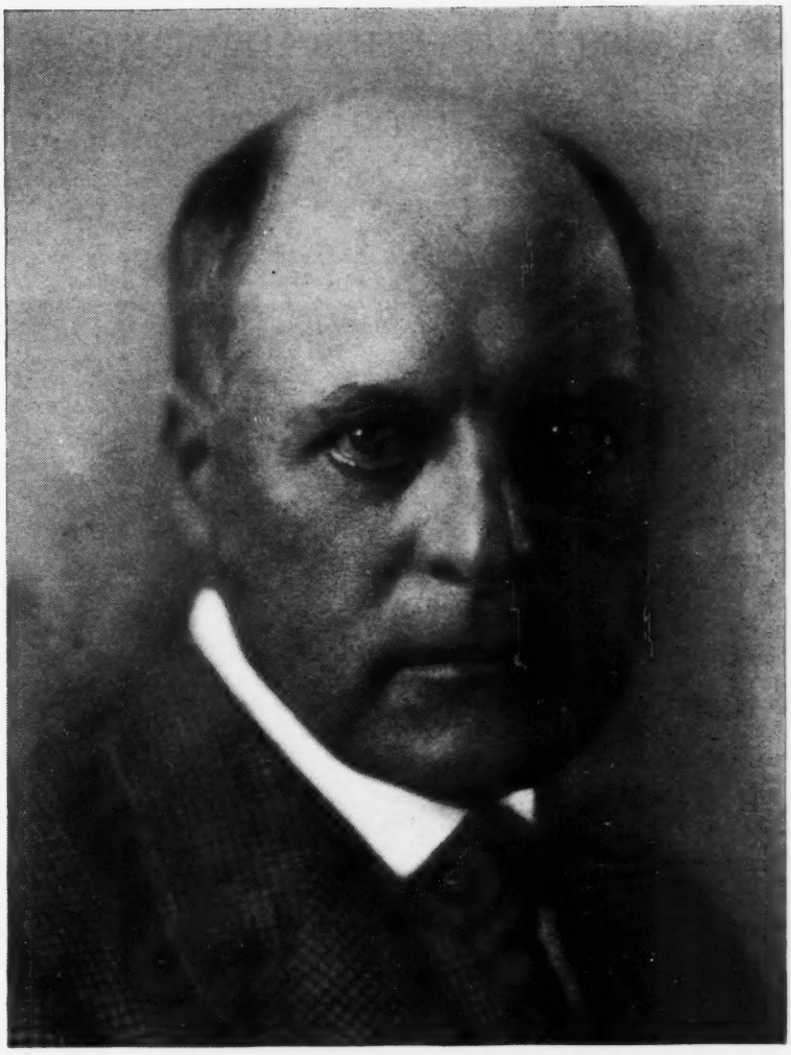
Central United States Group—*Robert W. Stewart, Standard Oil Co. of Indiana, Chicago; **S. C. Collins, Marland Refining Co., Ponca City; H. B. Earhart, White Star Refining Co., Detroit.

Eastern United States Group—*Amos L. Beaty, The Texas Co., New York; A. P. Coombe, Standard Oil Co. of Ohio, Cleveland.

Transportation Group

Ships—*J. Howard Pew, Sun Oil Co., Philadelphia.

Pipe Lines—**C. H. Kountz, Prairie Pipe Line Co., Independence, Kan.



Frank B. Fretter, president and general manager of the National Refining Co., Cleveland, newly elected director of the American Petroleum Institute, from the Eastern manufacturing group

Tank Cars—H. E. Felton, Union Tank Car Co., New York.

Supply Group

**John Reid, Joseph Reid Gas Engine Co., Oil City, Pa.

Natural Gas Group

A. B. MacBeth, Midway Gas Co., Los Angeles.

Natural Gasoline Group

D. E. Buchanan, Chestnut & Smith Corp., Tulsa.

Foreign Trade Group

W. C. Teagle, Standard Oil Co. of New Jersey, New York; H. L. Pratt, Standard Oil Co. of New York, New York; E. L. Doheny, Pan American Petroleum Co., New York.

At Large Group

*F. B. Henderson, Associated Oil Co., San Francisco; *W. G. Skelly, Skelly Oil Co., Tulsa; *E. W. Marland, Marland Oil Co., Ponca City; **S. A. Guiberson, Jr., Los Angeles; J. F. Lucey, Lucey Petroleum Co., Dallas; George H. Jones, Standard Oil Co. of New Jersey, New York; E. C. Lufkin, The Texas Co., New York; T. A. O'Donnell, California Petroleum Co., Los Angeles; W. N. Davis, Mid-Continent Oil & Gas Association, Bartlesville; E. B. Reeser, Barnsdall Corp., Tulsa; H. F. Sinclair, Sinclair Consolidated Oil Corp., New York; George S. Davison, Gulf Oil Corp., Pittsburgh; J. W. Van Dyke, Atlantic Refining Co., Philadelphia; H. L. Doherty, H. L. Doherty & Co., New York; Wallace E. Pratt, Humble Oil & Refining Co., Houston.

Among the newly elected members Arthur F. Corwin succeeds George W. Crawford of the Ohio Fuel Supply Co., Frank B. Fretter succeeds B. G. Dawes of the Pure Oil Co., S. C. Collins succeeds L. V. Nicholas, C. H. Kountz succeeds W. S. Fitzpatrick, John Reid succeeds W. K. Hughes of the Continental Supply Co., and S. A. Guiberson, Jr., succeeds D. M. Folsom.

The membership committee for the new year will be composed of J. F. Lucey, chairman; J. W. Van Dyke, F. B. Henderson, Frank B. Fretter and Roy B. Jones.

*Re-elected.
**New members.

Clearing It Up

R. E. Spears of Spears & Riddle, jobbers, Wheeing, W. Va., wishes it made plain that the Ethyl gasoline mixing plant located at the refinery of the American Oil Co., Baltimore, is a Spears & Riddle plant. National Petroleum News on page 90 of the Dec. 8 issue, published a story in which a list of Ethyl mixing plants was given.

The story did not state that Spears & Riddle own the Baltimore mixing plant and operate it, which Mr. Spears says is the case. Spears & Riddle were among the first companies to take on the distribution of Ethyl gasoline. The American Oil Co. is not an Ethyl gas distributor, merely selling to Spears & Riddle some of the gasoline that is ethylized in the mixing plant located at the American refinery.

Tulsa Entertains Institute In Original Style

TULSA, Dec. 11

IN a realistic oil field setting at the grounds of the International Petroleum Exposition, visitors at the A. P. I. meeting were offered an original entertainment following the annual dinner Dec. 7.

The dinner itself was announced as a genuine oil country feed and lived up to the promise with "Slum Gullion" as piece de resistance, instead of the usual filet mignon or spring chicken.

The stage of the exposition theater was designed to represent a derrick floor of a drilling well and was complete from bull wheel to chain hoist and forge. A pipe line gang invaded the rig shortly after the curtain was raised, interrupted drilling operations and sang a group of southern melodies. The male chorus in field clothes was the Tulsa Gleemen, a group composed almost entirely of oil company executives and employes.

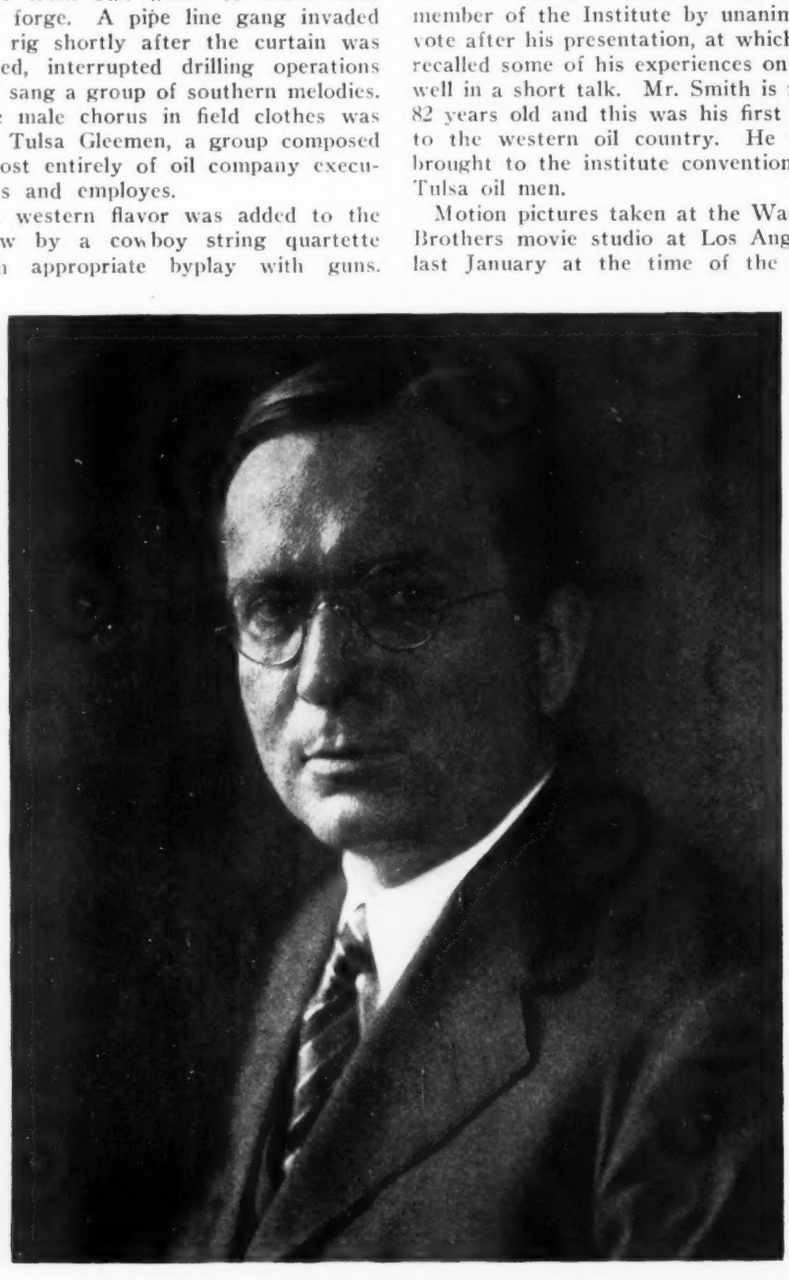
A western flavor was added to the show by a cowboy string quartette with appropriate byplay with guns. This part of the entertainment closed with a square dance by a dozen cowboys and cowgirls in brilliant costume. Chief Red Eagle of the Osages, from Pamhuska, with Mrs. Red Eagle, welcomed the oil men with a speech in Indian language which was translated.

A surprise feature of the entertainment was the presentation by R. L. Welch, general counsel of the A. P. I., of Samuel Smith of Titusville, Pa., who helped drill the Drake well. Mr. Smith was a boy in his teens when the well was drilled and helped his father, Billy Smith, who was Colonel Drake's tool dresser. He was made an honorary member of the Institute by unanimous vote after his presentation, at which he recalled some of his experiences on the well in a short talk. Mr. Smith is now 82 years old and this was his first trip to the western oil country. He was brought to the institute convention by Tulsa oil men.

Motion pictures taken at the Warner Brothers movie studio at Los Angeles last January at the time of the last annual institute meeting were shown as the first item on the program.

D. E. Buchanan, vice president of the Chestnut & Smith Corp., acted as master of ceremonies for the evening. As chairman of the entertainment committee he was largely responsible for arranging the show. Other members of his committee were Harry H. Smith, secretary of the Mid-Continent Oil & Gas Association, A. V. Bourque, secretary of the Association of Natural Gasoline Manufacturers, and Howard Bennette, managing director of the Western Petroleum Refiners Association.

Open house was maintained for visitors at homes of leading oil men living in Tulsa. A chief entertainer in this respect was W. G. Skelly, head of the Skelly Oil Co., a director of the institute.



Underwood & Underwood

He will continue to direct the activities of the American Petroleum Institute, as he has for the past seven years. R. L. Welch, secretary and counsel of the Institute

Mississippi Development Move Inaugurated

TULSA, Dec. 10.—Two late arrivals at the American Institute sessions in Tulsa were J. R. Crawford, vice president, and Joe B. Elam, secretary, of the Louisiana-Arkansas division of the Mid-Continent Oil & Gas Association. They hurried to Tulsa as quickly as they could after attending a meeting of the Mississippi Development Board at Amory, Miss., which was called for the purpose of bringing about a better understanding between the public and industry.

The Mississippi Development Board is an organization within the state of Mississippi, the purpose of which is to create an atmosphere of liberality towards corporations and to invite capital into the state. The state of Mississippi was represented at the meeting in Amory by Dennis Murfree, acting governor, and Rush Knox, attorney general, who, on behalf of the administration promised the enactment of laws under which corporations operating in the state would be relieved of past disabilities.

Secretary Elam and Mr. Crawford appeared on behalf of the Louisiana-Arkansas division to say to those assembled that certain relief would serve to attract major oil operating companies as prospective development goes ahead. Encouragement would result from giving pipelines the right of eminent domain. It was also urged that oil developing interests would regard as favorable the extension to development enterprises of the income exemptions already applying to manufacturers in Mississippi. These exemptions alleviate some of the inhibitions in the Mississippi constitution such as that against companies having more than $1,000,000 corporate investment in the state.

Messrs. Elam and Crawford submitted rules and regulations governing oil and gas conservation, anticipating that the legislature would create a state regulatory commission. The rules and regulations submitted were practically the same as those drafted in Arkansas at conferences of representatives of the state and industry and amended in line with field practice.

Stops at El Paso, Juarez and Dallas Entertain the Californians

By W. E. Green
N. P. N. Staff Writer, and Among Those Present

TULSA, Dec. 9

THE "Wildcat" Special from California arrived in Tulsa the morning of Dec. 6, loaded with oil men from the West Coast determined to have the time of their lives and at the same time gain much from the various sessions of the annual session of the American Petroleum Institute.

It would be improper to say the "California delegation was headed by—". There were many heads. Tom O'Donnell, first president of the Institute, joined the special at Palm Springs, but during the few hours out of Los Angeles before reaching Palm Springs, several had aspired to that honor. Among those taking the lead was "Ed" Higgins, "Dick" Guiberson, Ward Blodgett, "Len" Little, "Billie" McLaine, and others who might weigh more, but who had weaker voices.

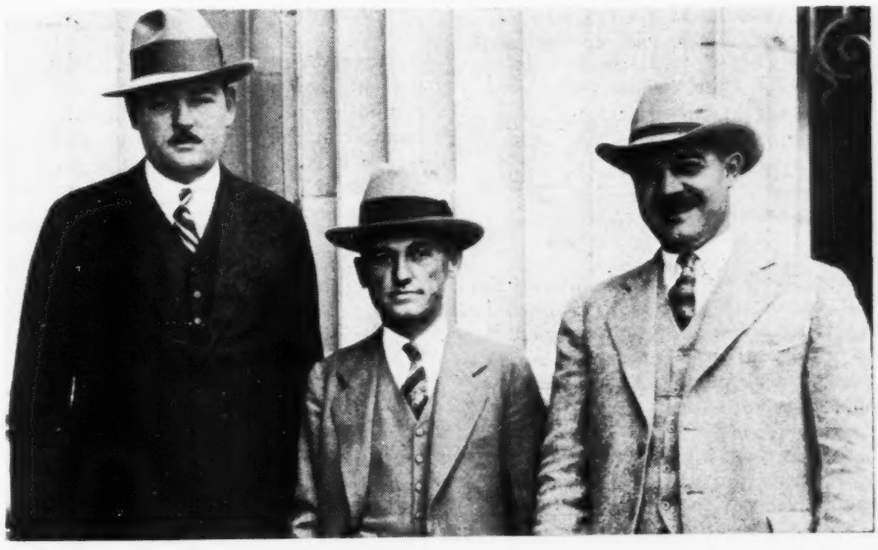
The special train, carrying over 100 men and seven women, was run under the auspices of the Chamber of Mines and Oil of California, with Edwin Higgins, secretary, and most of the other officials on board. The "Wildcat" committee of the Chamber was in immediate charge of the train, having made the arrangements with Southern Pacific officials, and arranged other details. C. L. McFaul, assistant passenger traffic manager of the Southern Pacific at Los Angeles, made the trip with the special from Los Angeles to El Paso to see that the oil men had everything they wanted. And those aboard were not bashful in making their wants known.

The train was held at El Paso for nine hours to give officials of the Rio Grande Oil Co. there an opportunity to entertain everyone on board. A golf game had been arranged, and F. P. Summers, purchasing agent of the Standard of California, won the tournament with a low net score of 72, and is showing his friends a new cigarette case, donated by the Rio Grande company.

Juarez Appeals

PROBABLY about 95 per cent of the delegation decided that they could play golf at home, but could not cross the border into Mexico, except upon such occasions as this. So this 95 per cent, including the seven ladies, were loaded into special touring cars and speeded on their way to the race track in Juarez, where bets were allowed with no limits, with refreshments available on all sides, to the rear, and across the street.

It might be proper to skip over the time of arrival in Juarez until 6 p.m. Money changed hands and many oil men were initiated into the "how" of passing along good American money to the book makers.



Here are the boys who so royally entertained the California delegation making the trip to Tulsa on the "Wildcat" Special. Left to right: Chas. S. Jones, vice president; L. E. Lockhart, president, and M. S. Beach, manager of the Land Department, Rio Grande Oil Co., El Paso, Texas

At 6 p.m. slightly in excess of 99½ per cent of the delegation was crowded in the Central Cafe in Juarez where a wild game dinner, with the proper refreshments, was served without a hitch, other than an outburst of songs, and just a little speech-making to properly introduce the hosts of the day. There was a splendid orchestra present to dispense music for the dancing, and the seven ladies of the party did not want for partners.

L. B. (Len) Little, general superintendent production department, Standard Oil Company of California, Bakersfield, at the A. P. I. meeting

To prove that the crowd was well behaved, it is only necessary to say that "Dick" Guiberson sang one song, and two encores. Not often would an American crowd in Mexico let any man sing one selection, much less two. We have saved the reputations of the California oil men.

The Mexican border closes at 9 p.m. at El Paso. The last of the delegation crossed the line at 9:43, and the special continued its journey at 10.

J. Edgar Pew of the Sun Oil Co., former president of the institute, entertained the party with a banquet at the Adolphus Hotel at Dallas, the train being held three hours so the delegation could enjoy this hospitality.

The entertainment at El Paso was advertised in advance. L. E. Lockhart, president of the Rio Grande Oil Co., and his assistants did not spare expense, time or personal endeavor to see that everyone had a good time. Those not in the know had to ask the names of the hosts.

Mr. Lockhart was assisted by C. S. Jones, vice president and treasurer;

M. S. Beach, manager of the land department, and Chas. Reed, in charge of production. Ed Higgins assisted in making final arrangements for the stop at El Paso.

The special train departed from Tulsa Thursday night for the return trip to California.

* * *

At the races in Juarez, Mrs. Thomas O'Donnell bet on the hunches. She decided that a horse with a good Irish name must either win or be in the money.

* * *

R. A. Broomfield, vice president of the Barnsdall Oil Co. of California, made the trip to Tulsa in the "Wildcat" Special. Ask some of the Californians if Friend Broomfield can buck a line.

* * *

The "Wildcat" Special hit a Ford just outside of Fort Worth. Two Los Angeles oil men on the observation platform administered Juarez "first aid" to the two occupants, and they went away happy.

* * *

Badges worn by the California delegation during the visit to Juarez aroused the interest of the natives. When told that the delegation was made up of oil men, the next question was "Are all of them millionaires?"

* * *

E. W. Clark, who was elected president of the American Petroleum Institute at Tulsa, made the trip from Los Angeles on the "Wildcat" Special, and enjoyed the fun as much as the youngest on board. He was a boy again.

* * *

Frank Hill of Los Angeles is "some" guardian. He was pilot for a party of six to Juarez and he boarded the special on time, but two of his party were missing.

* * *

"Dick" Guiberson brought his wife along, so she could stop off at Dallas to visit with friends and relatives. But the presence of Mrs. Guiberson did not cramp his style in the least. Dick sang for the crowd at the Central Cafe at Juarez, and it is doubted if another man could have held the crowd quiet as he did. Dick is the songster of the West Coast among oil men. His title is not disputed.

* * *

Eddie Goeser, Emsco v.p., likes to see the horses on the home stretch, but he decided that it was folly to bet his money as he never saw it again.

* * *

Norval White, A.P.I. West Coast representative, has more than one accomplishment. He acted as special announcer at the races in Juarez, and was free with advice. But none of his tips were worth a cent—in fact they cost real money.

* * *

"Len" Little of Standard of California thoroughly enjoyed his first trip in years to the Mid-Continent, and already is wondering if he can take enough time off next year to attend the next A.P.I. meeting.

* * *

W. L. Stewart, Jr., of the manufacturing department staff, Union Oil Co., was being shown the new Athletic Club at Dallas. He was much interested in the beautiful club building and its appointments, but when he saw the swimming pool, he lost all interest in anything else, and take a swim he did.

* * *

W. D. Stewart, treasurer of California Petroleum Corp., Los Angeles, was accompanied by his wife. She enjoyed the trip even more than Mr. Stewart. She thinks more of the California oil fraternity than ever.

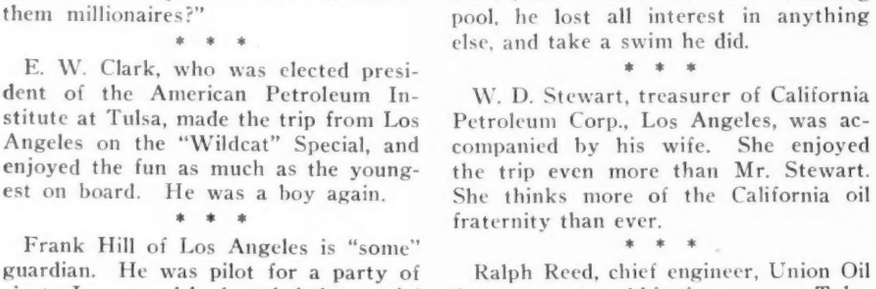
* * *

Ralph Reed, chief engineer, Union Oil Co., spent most of his time enroute Tulsa preparing his paper to be read at the A.P.I. sessions, and lining up other information, permitting E. W. Clark and others to do the playing.

* * *

Ward Blodgett, assistant general manager of the Chanslor-Canfield-Midway Oil Co., who directed the drilling of the deepest well in the world, knows how to play as well as drill wells. And he proved his accomplishments during the Los Angeles-Tulsa trip.

Henry Brown, treasurer, Continental Supply Co., St. Louis



The very serious one had just told a good joke (origin Hollywood) and the photographer was working fast. Left to right: H. W. Platenberg, manager of sales, Axelson Machine Company, Los Angeles; C. F. Camp, C. F. Camp Company, Tulsa; Dick Guiberson, West Coast manager, Guiberson Corporation, Los Angeles, and J. L. (Jack) McMahon, The Texas Co., Wichita Falls

Marland Melody Men Make Music

TULSA, Dec. 11.—No Tulsa convention would be completely rounded out any more without the Marland Melody Men. The A. P. I. saw this organization in action again with a repertoire of old favorites and new song hits.

The quartette has sung together long enough to achieve those finer phases of harmony that come only with experience. They sang on several occasions during the convention, including the one when they gave a concert in the lobby of the Hotel Mayo.

The personnel, reading from left to right—excuse it, please, we have no picture—from first tenor to bass is as follows: Hugh Sanders, insurance department, Marland Oil Co.; Joe McKinney, laboratory; Bee Crawford, accounting; C. W. Anderson, assistant to Fred Applegate, wholesale sales division. All are in the Ponca City offices.

Miller Back with Marland

TULSA, Dec. 11.—Ray E. Miller, who for the past two years has acted as director of the Petroleum Safety Council of the Mid-Continent Oil & Gas association, has resigned. He is again in charge of all safety work for the Marland companies, with headquarters in Ponca City. Mr. Miller spent five years with the Marland organization in safety work, and then went with the Safety Council on a leave of absence. A committee has been appointed to name his successor.

Doheny Testifies Patriotism Inspired Elk Hills-Pearl Harbor Deal

Staff Special
WASHINGTON, Dec. 11

BY the time this story reaches the reader the country should know whether E. L. Doheny, founder of the Pan American Petroleum & Transport Co., and Albert B. Fall, secretary of the interior in the Harding cabinet, have been convicted of conspiring to defraud the government in the Elk Hills naval oil reserve lease, or have been acquitted, or whether a mistrial has resulted.

Taking of testimony terminated today. Arguments of the government and defense attorneys are to take up most of Monday and Tuesday. Then the court's charge to the jury and the verdict if the jury can agree.

The remarkable story of the rise of E. L. Doheny to great business success was told from the witness stand Thursday by Mr. Doheny himself. He was born in Fond du Lac, Wis., more than 70 years ago, he said. He gave a detailed story of going west, of struggles in Mexico, the American side of the Mexican border, in Indian territory, in the Black Hills of the Dakotas, in Kansas, Utah, and Colorado.

Met Fall 40 Years Ago

MR. DOHENY said he first met Fall 40 years ago at Kingston, N. M., where he (Doheny) was the owner of some mining claims. Fall was working for the Gray Eagle mine. Later he and Fall helped to organize a new county and Fall was a candidate for election to the territorial legislature from the new county, the defendant testified.

Doheny said he once fell 105 feet down a shaft and both his legs were broken. While convalescing he read law, but not with the intention of becoming a lawyer. He also had taught school and at one time served as a waiter, he said. From Kingston Doheny went to Los Angeles where he again engaged in mining with a Mr. Canfield whom he had met at Kingston and who had struck a bonanza there.

After prospecting for gold in the vicinity of San Bernardino, Doheny said he returned to Los Angeles in 1892 following the discovery of oil indications there. He and Canfield, he said, sunk the first oil well there with a pick and shovel themselves. Oil in commercial quantities was found and in the next three or four years they drilled in 2700 wells in a strip 600 to 700 feet wide and two and a half miles long. They recovered nearly 100,000,000 barrels of oil.

Goes Into Bankruptcy

IN 1896 Mr. Doheny said he went into bankruptcy. He then went to Fullerton, 45 miles from Los Angeles, and opened a new oil field there, which he operated in partnership with the Santa Fe railroad. After three years he said he sold his interest to the Santa Fe and went to Bakersfield where he again operated in oil.

Mr. Doheny said he then began collecting a large amount of probable oil lands, some not far from Elk Hills, and at one time he was the largest holder of lands there.

In 1900, at the solicitation of a man who had been connected with the Santa Fe, Doheny went into Mexico to search for oil. It was discovered by him and Mr. Canfield, he said. The Mexican Petroleum Co. of California was organized to operate the oil development there. Something like $600,000,000 worth of oil was recovered in Mexico. This oil was marketed mostly on the Atlantic coast and in Mexico. A little went to Europe, he said.

Doheny said that, in going between New York and California, he often met Fall at Albuquerque, N. M., and thus the friendship established in 1886 was maintained. He said he had followed Fall's public career and that Fall and his family had visited at the Doheny home in Los Angeles.

Largest Taxpayer in Mexico

When Fall was in the Senate, he said he had contact with him then. Fall was a member of a committee that was investigating Mexican relations at one time. Doheny was a witness before the committee. Doheny said he was vitally interested in the committee's investigation because his company was the largest property holder in Mexico and the largest taxpayer, subject to the cupidity of everyone who held the reins of government there.

Doheny also said he frequently met Fall during the war when he (Doheny) was a member of the National War Service Committee. Mr. Doheny said that, as soon as war with Germany seemed imminent, he wired President Wilson offering the government the use of the tanker fleet of the Pan American Petroleum & Transport which was organized as a holding company by the Mexican Petroleum interests the year before. This offer was accepted after war was declared, he added.

Taking up the $100,000 loan to Fall, Frank J. Hogan, chief of Doheny's counsel, had the oil operator tell his version of this deal. His story was the same as outlined by Mr. Hogan in his statement to the jury and reported in National Petroleum News two weeks ago.

HE told of having his son, E. L. Doheny, Jr., draw $100,000 in currency from Blair & Co. in New York after Fall had telephoned him for that sum, and of sending the money to Washington by his son and his son's secretary. He explained the tearing of the Fall note into two parts as a way of protection to Fall should anything happen to him or Mrs. Doheny in their travels. Mrs. Doheny previously had testified to the same thing.

MR. DOHENY then was questioned about his talks with Capt. J. K. Robison who was chief of the bureau of engineering of the navy, concerning the war scare in the Pacific. Doheny said he became excited about the lack of defense of the Pacific coast and said he told Capt. Robison he would have his company, the Pan American, bid on the erection of a fuel oil base at Pearl Harbor, Hawaii. He said he regarded it then and still so regards it as a patriotic duty to make the bid.

AFTER the introduction of numerous documents and letters pertaining to the bid for the construction of the Pearl Harbor fuel base, Mr. Hogan concluded the direct examinaton of Doheny by asking him if he had any deal with Fall for the Elk Hills lease or any other oil lease. Mr. Doheny emphatically denied there had been any such deal or any suggestion of it. Previously he had said he had not proposed the oil lease preferential rights clause embodied in the Pearl Harbor contract.

Under cross-examination by Owen J. Roberts, special government prosecutor, Mr. Doheny said that recently he had loaned Fall $5000 more but admitted that the stock Fall had delivered to him as security for the $100,000 loan had a par value of only $3,300.

The cross examination of Mr. Doheny lacked the fire that had been directed at other defense witnesses by Mr. Roberts. Mr. Doheny had been ill with an infection of his left arm which still was in a sling when he was on the witness stand. He rested the arm on a pillow. Court adjourned last Tuesday because he was too ill to attend.

Only a few character witnesses were called for Fall who did not take the stand.

Sinclair, Fall to be Arraigned

WASHINGTON, Dec. 13.—Harry F. Sinclair, chairman, Sinclair Consolidated Oil Corp., and Albert B. Fall, former secretary of the interior, are to be arraigned Dec. 17 in the Supreme Court of the District of Columbia on an indictment charging them with conspiring to defraud the government in the leasing of the Teapot Dome naval oil reserve. An appeal to quash the indictment was recently lost in the United States Supreme Court.

Discussion Shows Need of Standard Test For Anti-Knock Value

By Paul Truesdell
N. P. N. Staff Writer

TULSA, Dec. 11

STANDARDIZATION of methods of test of motor fuels for anti-knock value was shown to be one of the urgent needs of the refining industry and the automotive industry at the group sessions on "Motor Fuel" which occupied Wednesday morning and afternoon at the institute convention. From the active discussion it developed that there are two points to be considered in establishing standards of anti-knock value.

First—A yardstick for measuring anti-knock value.

Second—A specified and universal method for applying that yardstick to the fuel to be measured.

A dozen or 15 technologists, familiar with the manufacturing and testing of motor fuels and also with the way it operates in an automobile engine, took active part in the discussion. It is safe to say that no two of them agreed on every point and in most cases they differed widely.

That work is under way to establish a standard unit of measure and standard methods of applying it developed after the meeting. Technologists of a number of companies interested in the sale of Ethyl gasoline are to hold a meeting next month to start work on preparing methods of test that can be made the standard of the industry, probably through the American Society for Testing Materials.

The companies that are working together are: Ethyl Gasoline Corp., Standard Oil Co. of New Jersey, Atlantic Refining Co., Standard Oil Co. of Indiana and perhaps the Associated Oil Co. of California and the Union of California both of which began the sale of Ethyl gasoline on Dec. 1.

There were other phases to the motor fuel group sessions, but the anti-knock problem far exceeded the other subjects in interest. It was at the afternoon session that discussion of this subject began. Dr. K. G. Mackenzie, chief chemist of The Texas Co., presided at this session, which began with a paper on natural gasoline by Dr. George Granger Brown of the University of Michigan who is carrying on research work on natural gasoline as a motor fuel for the Association of Natural Gasoline Manufacturers.

He stated that his work has shown him that natural gasoline has 60 per cent of the anti-knock value of benzol based on straight-run Pennsylvania gasoline. He stated that in general natural gasoline shows half the anti-knock value of benzol up to a blend containing 50 per cent of natural gasoline. He stated the opinion that the anti-knock effectiveness of natural gasoline is due to the fact that it decreases the rate of rise of pressure in the automobile engine cylinder.

Even the competitors are friendly with each other in California, and here we have W. A. (Art) Trout, vice president and manager, Emsco Derrick & Equipment Company, Los Angeles, and W. W. (Webb) Wilson, president, Wilson Oil Tools Company, whose home address is also Los Angeles, between trips

Natural Gasoline

HE was positive in his statement that adding natural gasoline to a fuel never decreases its anti-knock value and in most cases increases it by from five to 50 per cent of the value of an equivalent amount of benzol. Dr. Brown also repeated a good deal of what he stated in other papers at recent meetings to the effect that blending of natural gasoline with refinery gasoline up to the proportion of 50 per cent improves the starting and warming up quality of the fuel. Dr. H. C. Dickinson of the Bureau of Standards differed with Dr. Brown as to interpretation of his results.

He invited those interested to witness tests to be held next morning at the flying field with airplanes using straight natural gasoline as a fuel.

Dr. Graham Edgar, chief technologist of the Ethyl Gasoline Corp., stated that he thought the bouncing pin apparatus first suggested by Dr. H. C. Dickinson, of the Bureau of Standards and perfected and put to use by T. A. Boyd and Thomas Midgley, Jr., of the General Motors Research Corp., was a fairly satisfactory method of testing, with certain modifications but he did not believe that any single method will give reproducible results under all conditions because of the impossibility of controlling all the variable factors.

Dr. Edgar pointed out that the first thing necessary is to get a standard reference fuel which will always be uniform and obtainable by everybody, with which fuels to be tested can be compared. He mentioned the fuel he has developed consisting of a blend of a normal octane and a new, pure paraffin heptane which was first prepared in his laboratory, as suitable for a reference fuel because by blending these two hydrocarbons in the desired proportions it is possible to match the knocking qualities of any gasoline and thus give a definite standard.

Reference Fuel

THIS reference fuel was first announced by Dr. Edgar in a paper before the Petroleum Division of the American Chemical Society at Philadelphia last fall. It may be that this blend will be decided upon by the technologists collaborating on the anti-

knock testing problem as the standard reference fuel to be used. Dr. Edgar stated that such blends as those of ether and toluene were absolutely unsuitable as reference fuels.

The analytical method of determining anti-knock value proposed by Dr. Gustav Egloff and Dr. Jacque Morrell, of the Universal Oil Products Co., which consists of analyzing the fuel to be tested for paraffin, aromatic and unsaturated content and from the results determining the "aromatic equivalent" in the fuel, was attacked. It was stated the results obtained by this method do not check in an engine such as the bouncing pin apparatus.

Most of the speakers agreed that the bouncing pin apparatus as originally designed is not entirely satisfactory although some said they are using it with good results. Several speakers stated that they had adopted a water-cooled engine instead of the air-cooled Delco used in the original bouncing pin method as being more controllable and more resembling an automobile engine in operating conditions.

R. E. Wilson of the Standard of Indiana stated that he has developed a special engine for testing anti-knock value which he described as follows:

A single-cylinder Lockwood-Ash water-cooled marine engine fitted with a special head which gives a compression pressure of 125 pounds. The engine is equipped with a special carburetor designed to give a constant air-fuel mixture of 11 parts of air to one of fuel regardless of throttle opening or the gravity of the fuel.

The engine is run at a constant speed of 1200 r.p.m. The throttle is opened gradually and the power delivered before the knock begins is measured.

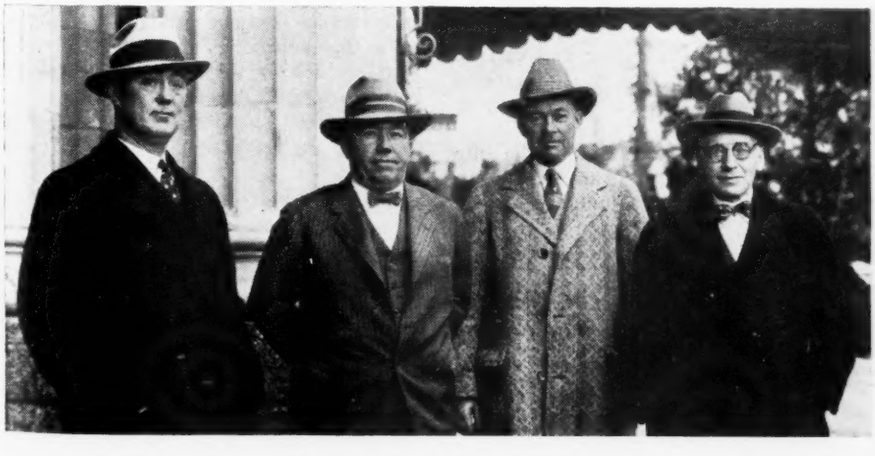
Compared With Benzol

DR. W. F. Faragher of the Universal Oil Products Co. stated he had developed a promising method of measuring anti-knock value by comparing the fuel to be tested with benzol.

Frank A. Howard of the Standard Development Co. stated that his company uses the bouncing pin method and verifies it by actual driving tests on the road, conducted by very skilled testers. He stated that the road tests check the bouncing pin laboratory tests very closely. Others who took part in the anti-knock symposium were, J. T. B. Bowles, Crown Central Petroleum Corp.; T. A. Boyd, who also read a paper. "The Motor Fuel of Tomorrow," which was published on page 48-N of the Dec. 8 issue of National Petroleum News; L. W. Parsons, Tide Water Oil Co.; A. Ludlow Clayden, Sun Oil Co.; Herschel Smith of the Gulf Refining Co.; E. C. Herthel, Sinclair Refining Co., and R. A. Halloran, Standard of California. Dr. T. G. Delbridge, supervisor of the process division of the Atlantic Refining Co., led the anti-knock discussion.

Underwood & Underwood

W. R. Boyd, Jr., re-elected assistant secretary and counsel of the American Petroleum Institute



This is not a male quartette, although the formation is the same as for "Sweet Ad-o-line." Left to right: Ed P. Ziegler, vice president, Franklin Valveless Engine Co., Franklin, Pa.; J. J. Klise, president, Kemrow Co., Wooster, O.; W. J. Flood, Oklahoma representative, Franklin Valveless company, Tulsa; C. H. Sheasley, president, Franklin Valveless company, Franklin, Pa.

The morning session of the motor fuel group meeting was presided over by E. L. Peck, general manager of the Empire Gasoline Co. The first paper was a summary by Dr. Dickinson of the results obtained by the cooperative research work on motor fuels carried out jointly by the American Petroleum Institute, the National Automobile Chamber of Commerce and the Bureau. This paper will be published in an early issue of National Petroleum News. A paper on "Fuel Characteristics and Engine Starting" by John O. Eisinger of the Bureau of Standards and T. O. Sligh Jr., now with the Studebaker Corp., was also read by Dr. Dickinson in the absence of the authors.

This paper was accompanied by charts showing average summer and winter temperatures prevailing in various parts of the United States and the 5 and 10 per cent points in the distillation range of gasoline necessary to give quick starting at those temperatures.

Effects of Corrosion by Hydrogen Sulfide And Rusting on Oil Storage Tanks

By L. G. E. Bignell
Parkersburg Rig & Reel Co.

Read at Symposium on Corrosion, A. P. I. Meeting, Tulsa, Dec. 9

THIS paper will deal with tank corrosion as observed in various oil fields and will be more in the nature of a recital of observations, rather than covering new phases of the general corrosion problem.

Tank corrosion is similar in its action to corrosion of steel in any other class of equipment, but the mechanical side of the problem may be divided to permit of closer study, as follows:

First—Outside rusting of deck and sides of tanks.

Second—Outside rusting of bottoms.

Third—Interior corrosion.

A—Normal corrosion due to electrochemical action.

B—Corrosion accelerated by hydrogen sulfide.

Taking up these various phases of the subject in the order of their classification, it is desired to first discuss outside corrosive action, or rusting, of tank decks and sides and the accompanying pictures will serve as good examples of the results of such corrosive action.

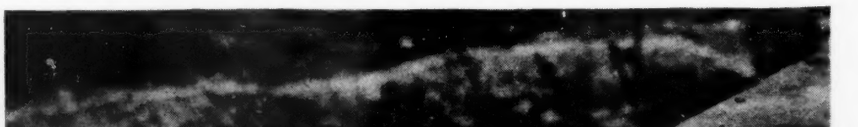


Fig. 1—View of the deck of a 55,000 barrel riveted steel tank in Augusta, Kans., showing effect of rusting

Edges Suffer Most

A CLOSE study of these pictures (Figs. 1 and 2) will show that the parts most affected are near the edges of the sheets, where the moisture accumulated due to slight depressions.

Note in the case of the thin sheets used to cover the 55,000 barrel tanks that the effect of corrosion is greatest at the edge of the deck due perhaps to a slight ridge being formed where the sheets were supported by the sides of the tank and the water accumulated back of the ridge in small pools and the metal under these small pools was acted upon more rapidly than the balance of the sheet.

It is also noted that sheets away from the edges have been badly corroded but this action seems to have occurred along the seams of two sheets and the action here may be due to a difference in potential between the two sheets, accelerated by the accumulation of water in slight depressions.

In the case of the 1000 barrel bolted steel tank, the rusting has been directly at the seams, and the uppermost sheet has been most affected.

This would indicate difference in potential between the sheets of steel making up the deck and the wrought iron bolts used to assemble them, the steel being positive to the iron.

The corrosion on side sheets is usually not so pronounced as on the decks for here the moisture will not accumulate in pools and the surface of the steel is more quickly dried.

The second condition deals with corrosion in tank bottoms from the outside and the action here is very similar to the action on pipe that is buried in the ground.

Some Soils Hasten Corrosion

SOME soils seem to present conditions that accelerate corrosion of this kind and selecting sites for large tank farms should receive special study of this particular phase of the project as it would eliminate the selection of ground that had these characteristics.

Some companies prefer to prepare the grade with a covering of oil or still bottoms, or any other thick viscous, oily mass that is free of sulfur and can be spread over the surface of the ground and the tank is then set directly upon this oiled surface.

This is a good protection, if the oily substance is carefully and uniformly applied and drainage around the grade made so that water will not later wash out this oiled earth and remove the protective medium.

A better way is to follow the practice used on many pipe lines and cover the bottoms with asphaltum and asbestos paper.

Asphalt-Asbestos Protection

TO APPLY this paper to the tank bottoms, the steel sheets making up the bottom are first turned bottom side up near the tank grade and covered with a coat of asphaltum, either in the liquid state or melted asphalt and the asbestos rolled over it, and the air bubbles pressed out and the sheets trimmed to the shape of the tank bottom sheets.

The sheet steel is then turned over and bolted together in the regular way, and to protect the heads of the bolts and the channel iron under the bottom they are covered with the liquid asphaltum by lifting up the bottom and reaching under it from the edges.

This kind of coating will protect the tank bottoms from moisture either in the soil or in the air that may accumulate or pass under the tank and it has a long life, sufficiently so to make it a good investment from the standpoint of insurance against probable corrosion from this source.

It is much better than attempting to lay down a "false bottom" made of planks placed side by side to cover the space on the grade upon which the tank will rest.

The objection to the false bottom for this purpose is that it never entirely covers the bottom, as there are cracks between the boards leaving portions of the tank bottom unprotected and moisture will accumulate along these openings in streaks on the bottom and the corrosive action will be accelerated there. So instead of serving the purpose for which it was intended such a false bottom actually is detrimental.

Setting tanks upon cement grades is all right if provision is made to sink the channel irons that form part of the bot-

tom of all bolted tanks into the concrete so that they will not hold that portion of the bottom sheets away from the concrete and form air passages under the tank where moisture will accumulate on the steel bottoms.

Sulfur In Cinders Destructive

THERE have been cases where tank grades have been made from cinders but it is thought that the disastrous results of such settings have been so fully advertised that this practice is entirely obsolete, for the sulfur remaining in the cinders quickly formed combination with the iron and destroyed the bottoms.

The third condition, that of interior corrosion due to the presence of oxygen dissolved in the water in the tank can be considered as only typical of corrosion that may occur in pipes, or other containers and will not be dealt with specially in this paper. A good protective paint will do much to retard and prevent such action within the tank, but this paint must have the qualities of resisting action of petroleum or petroleum products as naphtha sometimes occurs in such a form in some crude oils as to be very destructive to paints and therefore too much care cannot be taken in selecting protective coatings for this purpose.

Some oils on the Gulf coast smell very much like turpentine and analysis shows that they contain a product that has many of the properties of turpentine and will combine quickly with the vehicle in the paint and dissolve it and permit the pigment to be washed away by the oil and water within the tank.

Oils from the district around Cement, Oklahoma, have this same peculiar characteristic.

The second portion of the third condition deals with corrosive condition that is accelerated by the presence of hydrogen sulfide in the oil and gas coming into the tank.

Hydrogen Sulfide Serious

THIS is a condition that presents a very serious problem for it has been noted that tanks handling oil in fields where this gas is present in appreciable quantities have a very much shortened effective period of usefulness.

Sulfur is found with the oil in many fields and it has been noted that the amount of sulfur above .5 per cent has shortened the life of the tanks proportionately.

Hydrogen sulfide, that gas which is usually easily recognized because of the odor which is similar to that of rotten eggs, is formed by the decomposition of most organic substances containing sulfur.

In the Panhandle district along the Canadian River there is a gas stratum above the oil stratum that carries this hydrogen sulfide gas and both strata are in what is known as the "Big Lime."

This hydrogen sulfide is found in wells in Artesia, New Mexico, Colorado, Texas, Big Lake and McCamey, Texas, fields all within this same Permian limestone area and practically all of the same general character although the concentration is much higher in the southern fields of Big Lake and McCamey than in Panhandle, Artesia or Colorado.

There are numerous other places in this country where this hydrogen sulfide bearing oil is produced and it so happens that a number of these fields are now quite active and it is safe to predict that the oils of the future will be produced largely from limestone areas, considering the size of the area in West Texas and elsewhere that is probably oil land.

Fig. 2—Deck of 1000 barrel capacity bolted tank in the Orange, Texas, field

Soluble In Water

HYDROGEN sulfide is very soluble in water, as the following table will show:

Water will dissolve 2.8 times its vol- of H_2S at 32 deg. F.

Water will dissolve 2.8 times its volume of H_2S at 62 deg. F.

Water will dissolve .87 times its volume of H_2S at 212 deg. F.

(From Marks Handbook)

The aqueous solution is readily decomposed, especially in the light and when warm, by the oxygen of the air. The hydrogen is thus converted into water, and the sulfur is set free, the equation for this reaction being:

$2\ H_2S + O_2 = 2\ H_2O + 2\ S$

As an end equation of 1 we will use

$4(FeS\ H_2O) + 3\ O_2 = 2\ Fe_2O_3 + 4S.$

In the tank the gas will be liberated from the oil and seek the upper part of the tank, where the moisture from water vapors and from the atmosphere has been deposited on the under side of the deck, establishing the condition required for making the aqueous solution of H_2S.

The liberated sulfur being in contact with the iron of the tank makes combination with it and forms an iron sulfide scale.

Analytical Work

1. Sulfur in crude oil—Parr Oxygen bomb method.
   a. Crude from Colorado, Texas, Refinery 2.91%
   b. Fresh oil Miller Lease No. 1 .. 2.94%
   c. Stored oil Morrison No. 5 tank 2.88%
   (Oil in storage 7 to 10 days)

NOTE:—H_2S was present in a. and c. but b. gave a negative test for H_2S.

2. Analysis of Tank Scale from under side of deck.

Colorado, Texas

Calcium—(Ca)	00.000%
Iron—(Fe)	35.158%
Free Sulfur—(S)	48.406%
Sulfide Sulfur—(S)	13.750%
Sulfate—(SO_4)	00.885%
Chloride—(Cl)	00.000%
H_2S	00.000%
Total	99.391%

Water Soluble

Ferrous Iron—(Fe)	00.385%
Calcium—(Ca)	00.992%
Sulfate—(SO_4)	00.885%
Chloride—(Cl)	00.000%
H_2S	00.000%
Total	1.362%

NOTE:—Calcium .092% calculated, found .093%. The water soluble consisted of ferrous sulfate and calcium sulfate. A trace of ferric iron was present.

The accompanying picture (Fig. 3) shows the general appearance of this scale on the under side of a tank deck.

The action, while very general and destructive to the sheets, is deeper in some places than others and forms deep pits which have been known to extend through 14 gauge metal making the tank unfit for a container of oil or water. This condition has been brought about in about nine months.

Effect on Bottom

THERE is a secondary action that takes place in the tanks, particularly on the bottoms due to the presence of this iron sulfide scale, and that is the setting up of a galvanic current between the iron sulfide scale which is negative to the steel of the tank in the bottom where it sinks after falling from the roof.

The effect of this reaction is clearly

shown in the accompanying picture (Fig. 4) and that it is localized has been shown by examination of tank bottoms in old Mexico that have been destroyed and it has been noted that the portion corroded away was directly under the walkway on the deck of the tank. By workmen walking over the decks the scale had been loosened and fell to the bottom where it did great damage.

The sides of the tank can be affected by this iron sulfide scale also, because when it falls into the oil it is filmed over and being a sulfide has the property of floating upon water due to the film tension of the body of water.

Where the iron sulfide scale falls from the deck of the tank and comes to rest upon the bottom partly in contact with the bolts and steel it will serve as a connection between these two different metals and the bolts have been entirely destroyed.

All of these things described above have been observed, not in one field but in a number of fields, where hydrogen sulfide is common to the oil produced and in the Panhandle field reports have already been received that tanks are showing evidence of corrosion or rusting at certain levels around the side sheets and in the bottoms.

Partial Remedies

TO RETARD this action it is necessary to find some form of protective coating for the inside of the tanks that has the following qualities:

First—Is not soluble in petroleum or its products.

Second—Is not affected by brines.

Third—Will act as an insulator for the steel.

Fourth—Must be elastic with a coefficient of expansion practically the same as the steel.

Fifth—Must be in a condition to permit of its application in the field.

A fair degree of success has been had using a paint on the under side of the deck and on the upper portion of the side sheets that has the quality of protecting the iron against the sulfur that is liberated by the reaction above described and causing this sulfur to be deposited as free elementary sulfur, in which form it can be washed out of the tank with the oil without further damage to the tank, but it will undoubtedly give some trouble to the refinery when heat is applied to this oil.

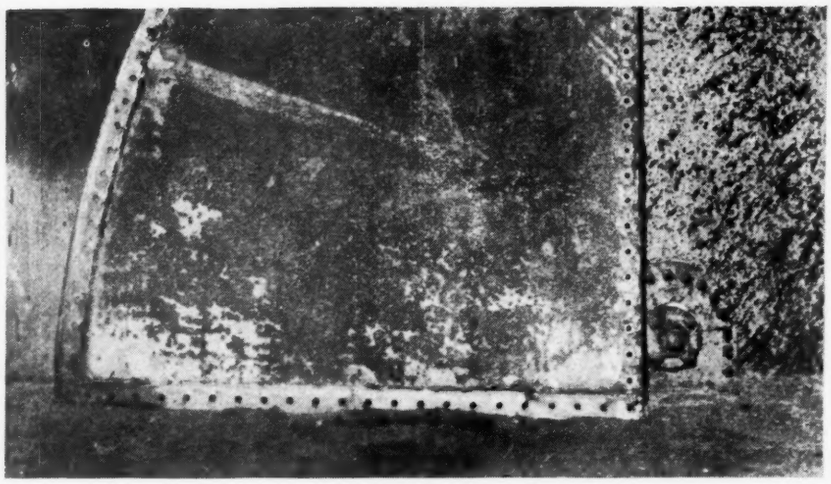


Fig. 3—Under side of part of deck from bolted tank in the Colorado, Tex. field, showing iron sulfide scale

This idea of "painting the decks to save the bottoms" eliminates to a very large degree the accelerated action on the bottom and sides of the tanks caused by iron sulfide scale, for the hydrogen sulfide being a gas at the normal temperatures and pressures within the tank will pass out of the oil, except a small portion that is entrained and held in small bubbles.

Deposit Sulfur on Sides

THESE bubbles may break along the sides of the tank due to heat and movement of the oil and deposit the sulfur they contain there and in this way there will be a limited amount of sulfur corrosion on the tank sides, after the deposition of iron sulfide from the deck has been stopped.

Another source of iron sulfide scale, and one to be seriously considered, is that from the tubing, rods and working barrel and pump within the well.

As the oil carrying this hydrogen sulfide gas is lifted from the well in the tubing the pressure is gradually reduced and the gas is constantly expanding and coming in contact with moisture along the sides of the tubing the reaction there is the same as it is on the deck of the tank. This scale is carried up with the oil stream and pumped into the tank, and will collect on sides and bottom much as the iron sulfide scale from the deck would collect.

This problem involves each department of the oil industry, the production department in securing the oil from the wells, and handling it on the leases; the pipe line department in transporting the oil from the lease to the refinery and the refinery in reducing the oil to its several products.

Research Work Needed

THEREFORE it seems logical to conduct research work that will develop some way to remove this sulfur either in the well itself, that is at the point of origin, or remove it immediately it comes to the surface.

There are about 33 gasoline plants in the Panhandle district operating or building that will have a capacity of approximately 367,000,000 cubic feet of gas per day.

Hydrogen sulfide gas has a specific gravity of 1.1906 and a 1 per cent mixture of this gas would make the H_2S weight 352,752 pounds.

Of this 352,752 pounds of hydrogen sulfide gas 94.1 per cent is sulfur or approximately 331,920 pounds or very nearly 166 tons. At the present market value of $19.00 per ton this sulfur refined would have a value of about $2754.

From our analysis of the iron sulfide scale we have seen that it took 35 pounds of iron to satisfy 52 pounds of sulfur and on this basis it will take approximately 111 tons of iron to satisfy this 165 tons of sulfur from the 1 per cent H_2S gas being produced daily, if all of this gas is handled in iron equipment.

It therefore seems that the only satisfactory solution and the only practical one will be to scrub or in some other way remove the hydrogen sulfide from the oil as produced and turn the sulfur into a valuable by-product and make it assist at least to some degree in paying for the protection needed for the equipment around the lease, pipe line, gasoline plant and refinery.

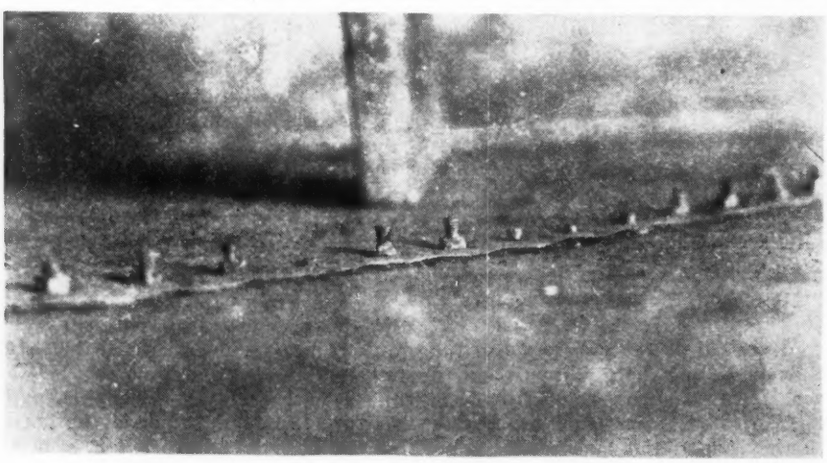


Fig. 4—View of bottom, showing bolts destroyed by iron sulfide scale falling from underside of deck

Wheaton bronze tank-car reducing connection. Made in three sizes: To reduce 5-in. outlet on tank car to 2, 2½, and 3-in. hose coupling — male or female threads.

Wheaton bronze gooseneck gasoline hose nozzle with hook for suspending hose. Made in 3 sizes: ¾, 1 and 1¼-in. FULL CAPACITY. Iron pipe or hose thread.

Wheaton bronze extension reducer for reducing pump outlet to accommodate small 1¼-in x 1-in. hose. Iron pipe or hose thread.

Wheaton solid bronze hinged filling-pipe cap with hasp for lock. Size: 2-in. Lugs on inside for strainer.

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Wheaton

Compilation Of Mid-Continent Refinery Operations

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National Petroleum News

Mid-Continent Refinery Operations Week Ended Dec. 10 (By Telegraph)

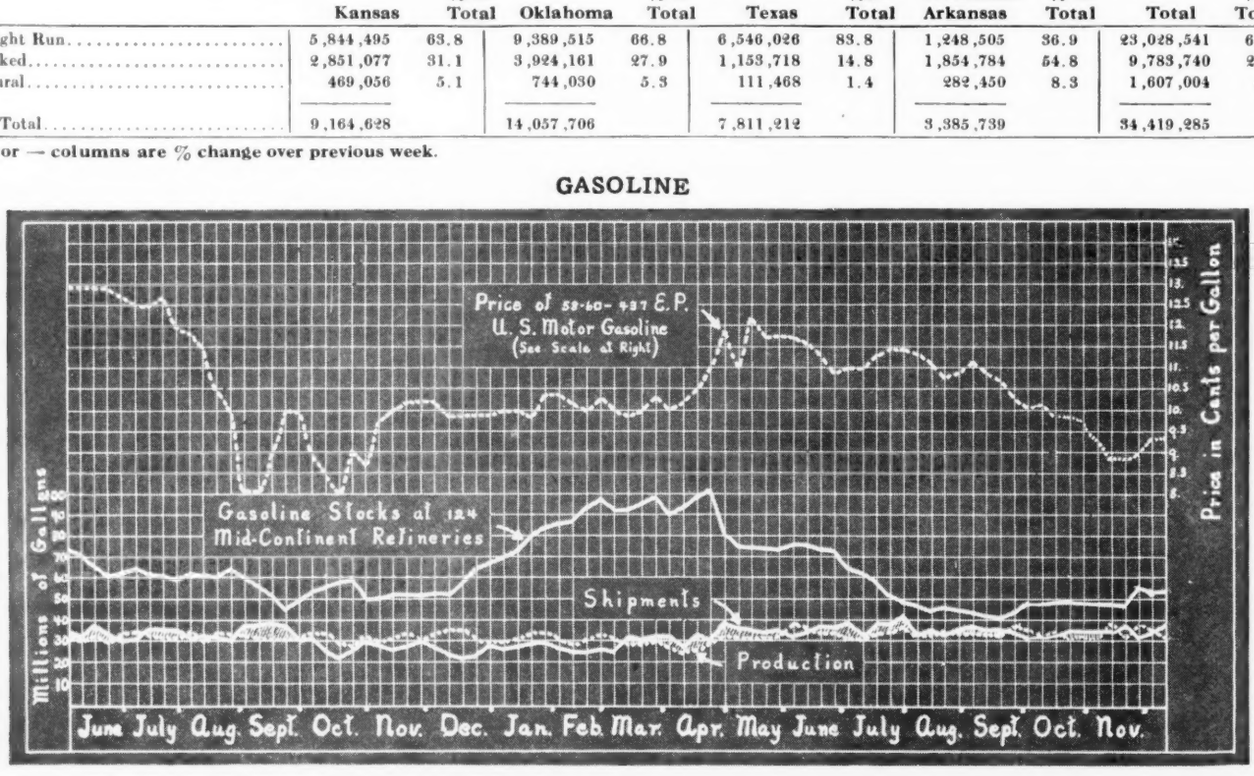
	Kansas	Oklahoma	North and Cent. Texas	North La.-Ark.	Total Week Ended Dec. 10	Total Week Ended Nov. 12
Plants Reporting	23	46	41	14	124	124
Crude Cap. (Bbls.)	98,200	165,900	144,300	53,700	462,100	462,100
Cracking Capacity	21,000	45,800	15,750	20,200	102,750	102,750
Da. Av. Crude Runs	59,506 — 1.2	98,667 — 1.8	69,642 + 0.9	56,045 + 0.8	283,860 — 0.5	294,086
Da. Av. Other Oils	6,267 +12.8	—2,366	5,939 + 7.8	1,362 — 78.3	11,202 —45.8	10,403
GASOLINE—Gallons						
Stocks Dec. 3	9,217,115	32,717,145	8,853,946	2,666,940	53,455,046	48,121,694
Prod. 12-3 to 12-10	9,164,629 + 4.1	14,057,706 — 2.4	7,811,212 + 1.2	3,385,739 + 1.9	34,419,285 + 0.5	37,026,123
Ship. 12-3 to 12-10	8,900,012 + 0.5	16,024,757 +17.8	7,817,389 — 2.9	3,600,316 + 7.6	36,342,474 + 7.3	36,175,998
Stocks Dec. 10	9,481,731 + 2.9	30,750,094 — 6.0	8,847,669 — 0.1	2,452,363 — 8.0	51,531,857 — 3.6	48,971,819
Ratio Sales to Prod	97.1%	114.0%	100.1%	106.3%	105.6%	97.7%
KEROSENE—Gallons						
Stocks Dec. 3	3,538,936	5,540,496	2,379,952	472,560	11,931,044	10,987,482
Prod. 12-3 to 12-10	1,726,913 — 3.5	1,893,883 + 4.6	1,769,276 —20.6	533,303 + 29.0	5,923,325 — 5.1	6,130,944
Ship. 12-3 to 12-10	2,113,118 +38.1	2,005,963 +30.0	2,109,514 + 5.7	360,959 — 18.2	6,589,554 +19.6	6,530,168
Stocks Dec. 10	3,151,831 —10.9	5,428,366 — 2.0	2,039,714 —14.3	644,904 + 36.5	11,264,815 — 5.6	10,588,258
Ratio Sales to Prod	122.4%	105.9%	119.2%	67.7%	111.2%	106.5%
STOVE DISTILLATE—Gallons						
Stocks Dec. 3	5,602,583	6,089,776	994,664	247,859	12,934,882	14,351,731
Prod. 12-3 to 12-10	1,159,378 +39.3	675,790 +16.9	340,428 +13.9	122,015 +114.2	2,297,611 +30.1	2,058,273
Ship. 12-3 to 12-10	1,577,868 +57.6	1,204,773 +39.7	299,140 —45.8	104,340 + 13.9	3,186,121 +27.1	2,041,136
Stocks Dec. 10	5,184,093 — 7.5	5,560,793 — 8.7	10,359,952 + 4.2	265,534 + 7.5	12,046,372 — 6.9	14,368,868
Ratio Sales to Prod	136.1%	178.3%	87.9%	85.5%	138.7%	99.2%
GAS OIL—Gallons						
Stocks Dec. 3	5,485,841	30,490,339	7,680,569	3,194,189	46,850,938	54,219,967
Prod. 12-3 to 12-10	1,465,599 +19.9	2,158,732 —14.7	2,359,705 +20.2	2,623,882 — 13.1	8,607,918 — 1.4	6,503,891
Ship. 12-3 to 12-10	1,641,542 —14.1	1,665,417 —31.4	1,249,609 —70.1	2,844,234 — 1.4	7,400,902 —36.0	8,056,978
Stocks Dec. 10	5,309,798 — 3.2	30,983,654 + 1.6	8,790,665 +14.5	2,973,837 — 6.9	48,057,954 + 2.6	52,666,880
Ratio Sales to Prod	112.0%	77.1%	53.0%	108.4%	86.0%	123.9%
FUEL OIL—Gallons						
Stocks Dec. 3	13,040,843	67,490,985	12,218,144	9,127,461	101,877,433	105,710,498
Prod. 12-3 to 12-10	5,532,024 + 4.5	6,534,809 — 4.7	7,997,638 — 6.2	8,983,425 + 0.8	29,047,896 — 1.8	30,122,708
Ship. 12-3 to 12-10	6,331,866 + 0.7	7,939,115 — 5.2	7,690,643 —11.6	9,089,545 — 14.0	31,051,169 — 8.5	26,900,574
Stocks Dec. 10	12,241,001 — 6.1	66,086,679 — 2.1	12,525,139 + 2.5	9,021,341 — 1.2	99,874,160 — 2.0	108,922,632
Ratio Sales to Prod	114.5%	121.5%	96.2%	101.2%	106.9%	89.3%

Gasoline Produced by Various Methods, Week Ended Dec. 10

	Kansas	% of Total	Oklahoma	% of Total	Texas	% of Total	Louisiana-Arkansas	% of Total	Total	% of Total
Straight Run	5,844,495	63.8	9,389,515	66.8	6,546,026	83.8	1,248,505	36.9	23,028,541	66.9
Cracked	2,851,077	31.1	3,924,161	27.9	1,153,718	14.8	1,854,784	54.8	9,783,740	28.4
Natural	469,056	5.1	744,030	5.3	111,468	1.4	282,450	8.3	1,607,004	4.7
Total	9,164,628		14,057,706		7,811,212		3,385,739		34,419,285	

+ or — columns are % change over previous week.

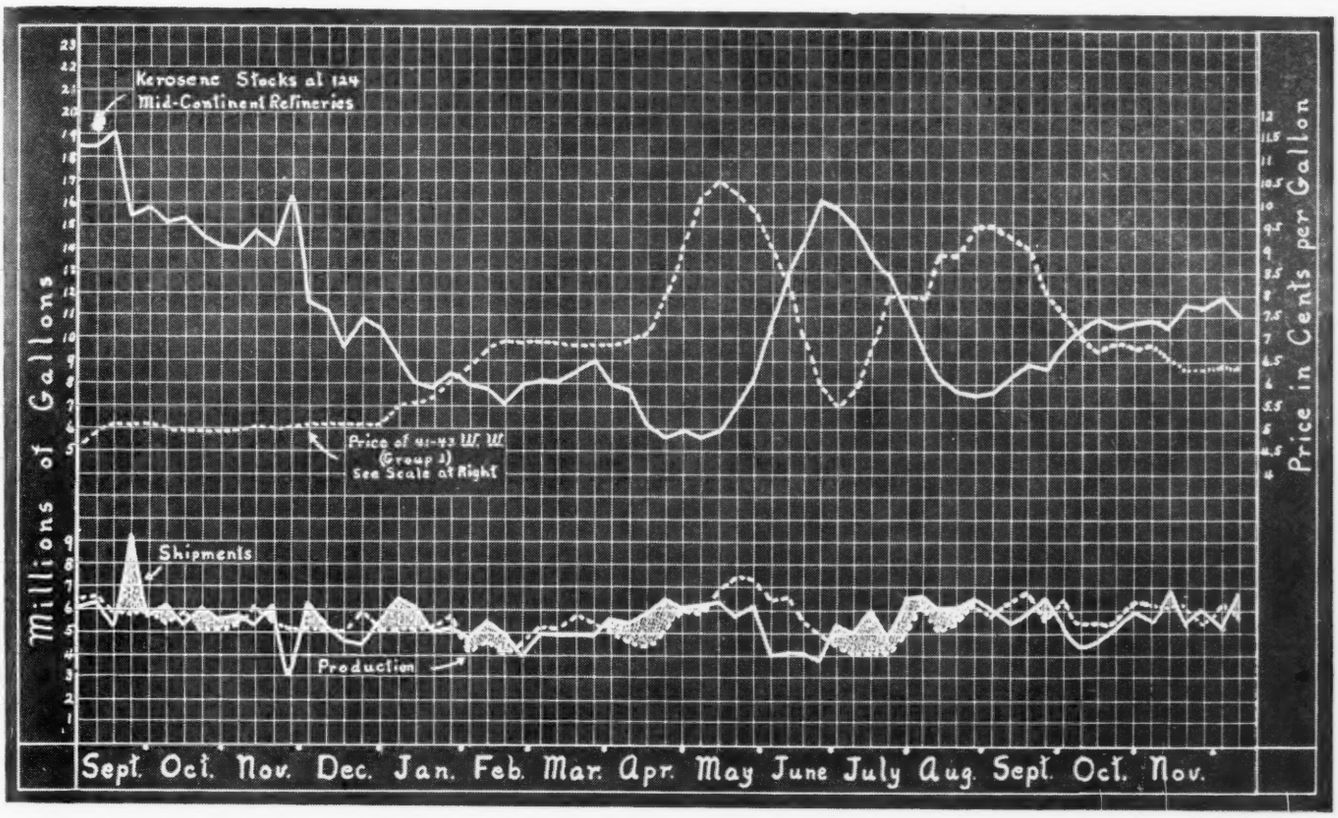
GASOLINE


Price of 58-60-48.7 E.P. U. S. Motor Gasoline (See Scale at Right)
Gasoline Stocks at 124 Mid-Continent Refineries
Shipments
Production
Millions of Gallons
Price in Cents per Gallon
June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov.

Barometer of Mid-Continent Refinery Market—Week Ending Dec. 10

Charted Course of Prices, Production, Shipments, Stocks of Principle Refined Products, Week by Week, From Reports Made by 124 Plants to National Petroleum News

KEROSENE


Kerosene Stocks at 124 Mid-Continent Refineries
Price of 41-43 W. W. (Group 3) See Scale at Right
Shipments
Production
Millions of Gallons
Price in Cents per Gallon
Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov.

Gasoline, Kerosene, Furnace Oil Stocks Reduced

Staff Special—By Telegraph

TULSA, Dec. 14

STOCKS of all principal commodities except gas oil were reduced at 124 Mid-Continent refineries in the week ended Dec. 10, according to reports collected by National Petroleum News. Although charges of crude to stills were reduced slightly the draft on stocks was caused largely by an increase in demand as indicated by larger shipments in the case of gasoline, kerosene, and stove distillate.

Since the middle of October shipments of home heating distillates have been increasing steadily. In the week ended Oct. 15 shipments of home heating oils totaled 1,430,623 gallons. In the week ended Dec. 10 shipments were 3,186,121 gallons from all plants.

To meet the larger demand refiners have been adjusting their runs to produce a larger quantity. In the week just closed production was increased from 2,085,582 gallons to 2,297,611 gallons. The increases in production have not met the demand fully. Stocks have fallen from 14,368,868 gallons on Nov. 12 to 12,046,372 gallons. Stove distillate stocks at Mid-Continent plants are far below their level of a year ago. On Dec. 11, 1925, the same group of plants reported a total of 18,252,236 gallons.

Every group in the field except Kansas drew on gasoline stocks last week. In that state stocks were increased approximately 250,000 gallons. In Oklahoma gasoline stocks were reduced 2,000,000 gallons to 30,750,094 gallons. In north Texas there was only a slight reduction while in north Louisiana and Arkansas the reduction was a little over 200,000 gallons. Total shipments from all reporting plants increased 2,500,000 gallons from the next previous week to a total of 36,342,474 gallons. In the corresponding week a year ago total shipments from the same group of plants were 27,326,673 gallons. On Dec. 11, last year, total gasoline stocks were 56,743,949 gallons compared with 51,531,857 gallons in this report.

Shipments of kerosene increased a million gallons during the week to a total of 6,589,554 gallons causing a reduction in stocks of nearly 700,000 gallons to 11,264,815 gallons. Every group in the field except north Louisiana and Arkansas participated in the stock reduction.

Shipments of fuel oil dropped 2,900,000 gallons below the total reached during the week of December third but were great enough still to cause a reduction of one million gallons in stocks. Stocks at the close of the week totaled 99,874,160 gallons a reduction of over nine million gallons during the past four weeks. Gas oil stocks increased 1,200,000 gallons when shipments dropped 36 percent to 7,400,902 gallons. Total stocks at the end of the week were 48,057,954 gallons.

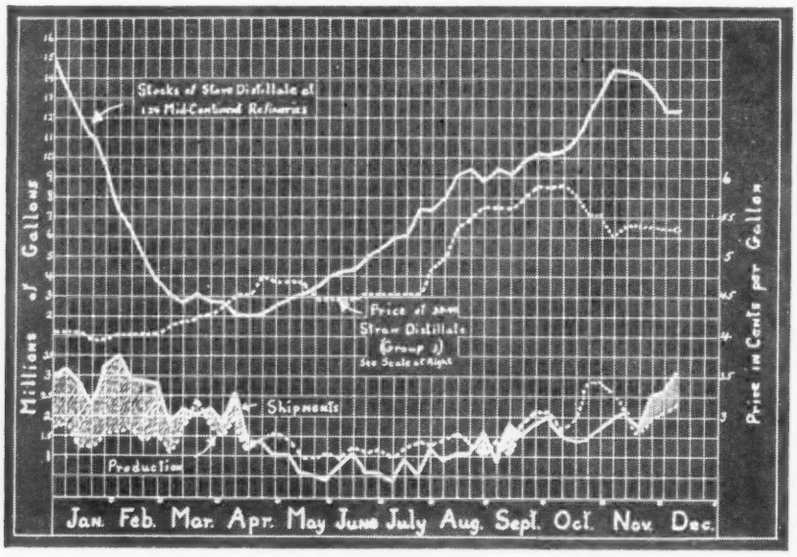
Summary for the Month

Production and shipments, all reporting refineries, for four weeks ended Dec. 10. Change in stocks figured from Nov. 12.

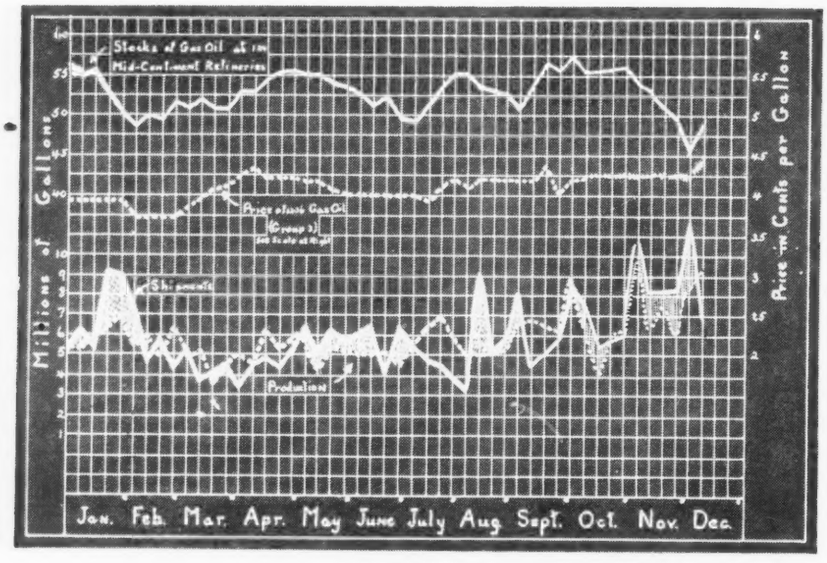
	Gallons
Gasoline	
Production	140,597,523
Shipments	138,037,485
Net change in stocks	+2,560,038
Ratio sales to production	98.2%
Kerosene	
Production	24,057,376
Shipments	23,380,819
Net change in stocks	+676,557
Ratio sales to production	97.2%
Stove Distillate	
Production	7,771,561
Shipments	10,094,057
Net change in stocks	—2,322,496
Ratio sales to production	129.9%
Gas Oil	
Production	30,873,622
Shipments	35,482,548
Net change in stocks	—4,608,926
Ratio sales to production	114.9%
Fuel Oil	
Production	117,593,274
Shipments	126,641,746
Net change in stocks	—9,048,472
Ratio sales to production	107.7%

Barometer of Mid-Continent Refining Market—Week Ending Dec. 10.

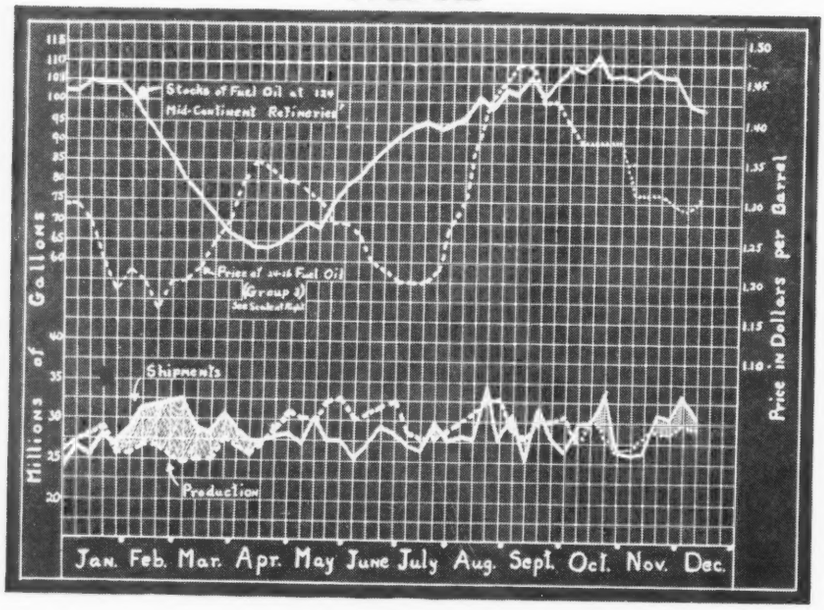
STOVE DISTILLATE


Stocks of Stove Distillate at 120 Mid-Continent Refineries
Price of 30-36 Stove Distillate (Group 2) See Scale at Right
Shipments
Production
Millions of Gallons
Price in Cents per Gallon
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

GAS OIL


Stocks of Gas Oil at 120 Mid-Continent Refineries
Price of 36-40 Gas Oil (Group 2) See Scale at Right
Shipments
Production
Millions of Gallons
Price in Cents per Gallon
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

FUEL OIL


Stocks of Fuel Oil at 120 Mid-Continent Refineries
Price of 30-36 Fuel Oil (Group 2) See Scale at Right
Shipments
Production
Millions of Gallons
Price in Dollars per Barrel
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

Retail Auto Sales 16% Larger This Year

NEW YORK, Dec. 11.—Automotive Industries this week says:

For the first nine months of 1926, retail sales were 16 per cent over the same period of 1925. The gains and losses for the individual companies varied greatly, but the assumption that all of the increase went to the few big producers is not a fact. Three or four comparatively small companies were among the leaders in sales gains, and two or three large ones were well under their last year's figures.

November production of cars and trucks is estimated at about 245,000 units, against 349,408 in October and 377,483 in November of 1925. The total for the year to date is thus brought to approximately 4,272,000 vehicles, against 4,336,271 for the entire year 1925. The November rate of output was the lowest of the year, and December production will probably be under November.

While the figures are definite evidence of general curtailment, the drop last month as compared with the rate of a year ago is largely attributable to lower operations by Ford, who was still in active production then on new models. Other companies in November were less than 8 per cent under their totals for the same month of 1925.

Dealers' stocks are now fairly heavy, and although this condition may be justified, at least in part, by factors that have arisen this year, it is plainly indicated that a considerable rise in demand for cars will be necessary before the factories begin to step up output. It is confidently felt that with the opening of the national automobile shows in January that stimulus will be given to buying.

Bellis Co. Adds 3,500,000 Gallons Storage

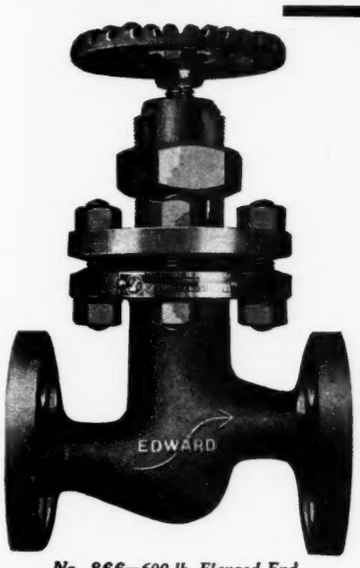
WORCESTER, Mass., Dec. 14.—A nine-acre tract on which will be built storage for 3,500,000 gallons of petroleum products, has just been bought by F. C. Bellis Co. The property is on West St., West Auburn, and has a frontage of 1131 feet on the Boston & Albany railroad with siding for 12 tank cars. A pump house is under construction.

The installation of tanks has begun and the work is expected to be completed by Jan. 1. A fuel oil tank with a capacity of 1,260,000 gallons will be erected in the spring.

Storage capacity of Bellis' present Worcester plant is 300,000 gallons. The additional facilities will give the Bellis company one of the largest inland bulk stations in the eastern states.

Frank C. Bellis is president of the company and A. R. Tattersall is secretary and treasurer.

—for Forged Steel Valves?



No. 866—600 lb. Flanged End, Flanged Bonnet, O. S. & Y. Globe Valve

Why EDWARD of course!

For fourteen years **Edward forged steel** valves have been marketed as a standardized product.

Even as pioneers, Edward fostered the principle of general use of **forged steel** small valves in preference to valves of cast materials.

This theory is now finding great favor as indicated by the wholesale selection and very definite preference for **forged steel** in the moderate classes of service as well as the more severe.

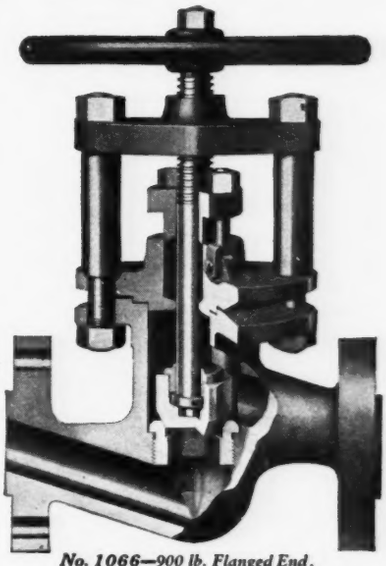
Edward continued leadership is evidenced by its variety of advanced designs.

Therefore—if it is **forged steel valves** you want—put your requirements up to Edward.

Complete data and prices sent upon request.

The Edward Valve & Manufacturing Co.
East Chicago, Indiana

Representatives in all principal cities.

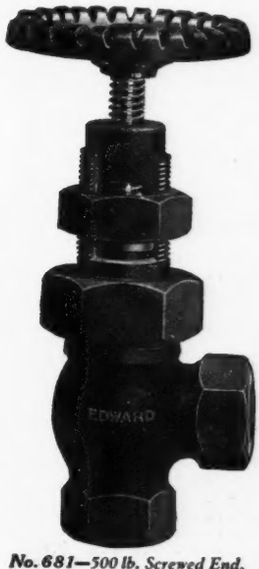


No. 1066—900 lb. Flanged End, Flanged Bonnet, Globe Valve

No. 876—600 lb. Flanged End, Union Bonnet, O. S. & Y. Globe Valve

No. 876G—600 lb. Flanged End, Flanged Bonnet, O. S. & Y. Globe Valve

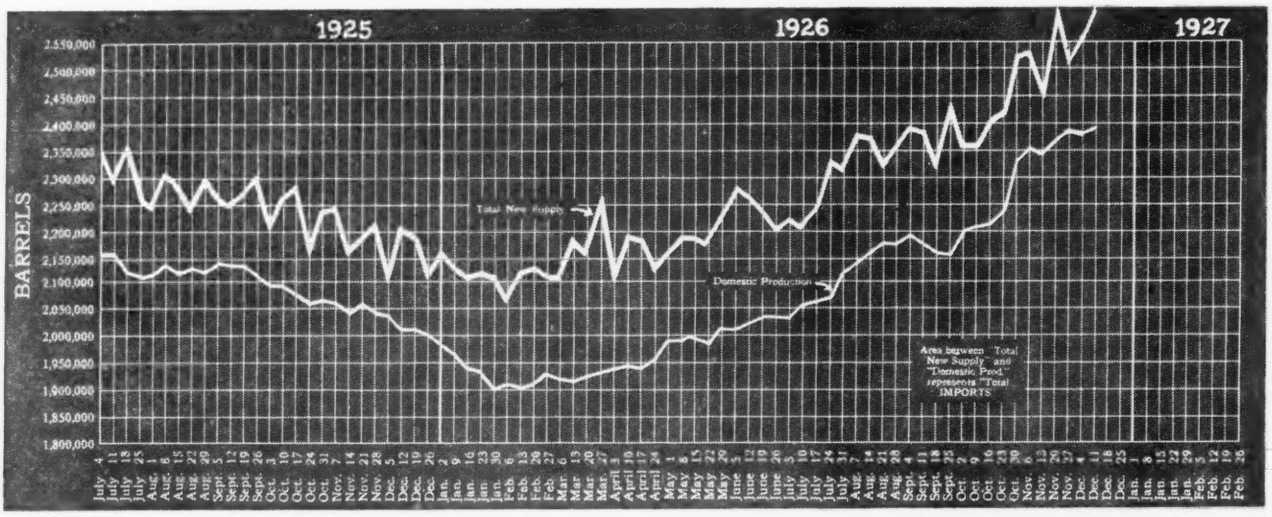
No. 682—500 lb. Screwed End, Union Bonnet Globe Valve



No. 681—500 lb. Screwed End, Union Bonnet Angle Valve

No. 680G—500 lb. Screwed End, Flanged Bonnet, O. S. & Y. Globe Valve

Daily Average Crude Oil Production and Imports



Daily average gross output of United States, by fields, for week ending with dates given below, as compiled by American Petroleum Institute.

Production Summary

	Dec. 11	Dec. 4
Production East of Rockies	1,740,550	1,730,500
Increase		10,050
Total Production in U. S.	2,396,250	2,388,800
Increase		7,450
Crude Oil Imports	263,714	165,000
Increase		98,714
Total Crude Supply	2,659,964	2,553,800
Increase		106,164

OKLAHOMA

	Dec. 11	Dec. 4
North Braman	22,600	26,400
South Braman	4,800	5,100
Blackwell	3,700	3,750
Hubbard	4,400	3,300
Thomas	2,250	2,200
Tonkawa	30,000	30,750
Garber	22,900	24,350
Burbank	44,650	44,500
Osage, outside Burbank	35,000	34,950
Watchorn	3,700	3,400
Cushing	21,450	21,400
Yale Jennings	12,700	12,800
Davenport	5,200	4,950
Bristow-Slick	27,250	26,900
North Okmulgee	17,500	17,400
Lyons-Deaner	4,200	4,050
Stroud	2,000	1,950
Cromwell	14,650	14,300
Papoose	9,100	9,100
Wewoka	24,600	24,350
Seminole	130,350	112,300
Duncan district	7,000	7,100
Graham	8,900	8,950
Fox	2,050	1,900
Healdton	15,250	15,000
Scholem-Alechem	9,000	9,000
Hewitt	10,900	11,000
Others	68,550	66,750
Total Oklahoma	564,650	547,900
Increase		19,750

KANSAS

Greenwood County	44,850	45,150
Florence-Covert	1,900	1,900
Peabody-Elbing	4,200	4,100
Eldorado-Towanda	13,400	13,550
Augusta-Fox-Bush	4,950	4,950
Rainbow Bend	3,700	3,350
Russell	4,200	4,200
Churchill	12,250	11,850
Others	29,700	30,100
Total Kansas	119,150	119,150

ARKANSAS

El Dorado	6,450	6,700
Smackover, light	13,000	13,300
Smackover, heavy	110,750	110,800
Stephens	1,500	1,550
Nevada	2,000	1,800
Lisbon	6,450	6,450
Total Arkansas	140,150	140,600
Decrease		450

NORTH LOUISIANA

Homer	5,400	5,400
Haynesville	8,600	8,800
Caddo, light	10,300	10,150
Caddo, heavy	4,950	5,200
De Soto, Red River	4,200	4,200
Elm Grove	600	550
Bellevue	1,700	1,700
Cotton Valley	6,750	6,750
Urania	13,400	13,100
Total N. Louisiana	55,900	55,850
Increase		50

NORTH TEXAS

Burkburnett	14,650	14,600
Electra	16,950	16,900
Iowa Park and K-M-A	4,950	4,950
Wilbarger	16,300	15,850
Montague-Cooke counties	12,650	12,300
Hutchinson County	146,200	145,100
Balance Panhandle	13,000	13,900
Archer County	35,600	35,200
Others	1,300	1,300
Total North Texas	261,600	260,100
Increase		1,500

EAST CENTRAL TEXAS

Mexia	11,300	11,250
Currie	800	800
Richland	1,450	1,450
Corsicana-Powell	24,400	24,350
Wortham	6,100	6,150
Nigger Creek	11,250	10,950
Total East Central Texas	55,300	54,950
Increase		350

WEST CENTRAL TEXAS

Stephens County	11,200	11,000
Eastland County	6,100	5,900
Desdemona	1,750	1,700
Young County	8,900	8,800
Brown County	17,250	16,950
Palo Pinto County	450	450
Callahan County	3,750	3,700
Shackleford County	14,950	14,850
Reagan County	29,000	29,450
Coleman County	500	500
Crane and Upton Counties	22,900	22,350
Mitchell-Scurry Counties	3,700	3,600
Others	6,400	5,550
Total West Central Texas	126,850	124,800
Increase		2,050

SOUTHWEST TEXAS

Luling	18,350	19,650
Laredo District	16,200	16,900
Somerset	1,950	1,950
Lytton Springs	3,150	3,150
Piedras Pintas	450	450
Others	600	600
Total Southwest Texas	40,700	42,700
Decrease		2,000

GULF COAST

Goose Creek	7,600	7,600
Hull	21,200	21,100
Saratoga	1,200	1,250
Blue Ridge	3,900	5,050
Damon Mound	850	1,050
Batson	1,750	1,700
West Columbia	9,750	9,650
Humble	4,400	4,400
Pierce Junction	6,700	6,400
Sour Lake	5,400	5,700
Spindletop	89,850	84,750
Orange County	6,650	7,250
Edgerly	550	800
Evangeline	1,400	1,150
Vinton	5,650	6,100
Lockport	3,200	3,950
South Liberty	4,600	4,550
Big Creek	1,350	1,400
Boling	2,450	2,550
Others	2,850	2,400
Total Gulf Coast	181,300	178,800
Increase		2,500

ROCKY MOUNTAIN

WYOMING

Salt Creek	40,150	45,950
Grass Creek	3,050	3,150
Elk Basin	750	800
Big Muddy	3,100	3,100
Lost Soldier	5,050	5,100
Rock River	2,900	2,800
Teapot Dome	950	1,250
Lance Creek	700	750
Others	1,900	2,000
Total Wyoming	58,550	64,900
Decrease		6,350

MONTANA

Cat Creek	2,600	2,600
Sunburst	9,000	14,000
Others	200	200
Total Montana	11,800	16,800
Decrease		5,000

COLORADO

Moffat (Craig)	3,300	3,150
Fort Collins	3,800	3,550
Florence	450	450
Others	600	600
Total Colorado	8,150	7,750
Increase		400

NEW MEXICO

Artesia	2,300	2,300
Hogback	700	650
Table Mesa	300	250
Rattlesnake	2,650	2,000
Total New Mexico	5,950	5,200
Increase		750
Total Rocky Mountain	84,450	94,650
Decrease		10,200

CALIFORNIA

Santa Fe Springs	45,000	45,500
Long Beach	94,500	96,500
Huntington Beach	90,000	85,000
Torrance	26,500	26,500
Dominguez	19,000	19,500
Rosecrans	13,500	13,500
Inglewood	39,500	40,000
Midway-Sunset	92,500	94,000
Ventura Avenue	54,700	56,800
Seal Beach	8,000	8,000
Others	172,500	173,000
Total California	655,700	658,300
Decrease		2,600

EASTERN

(Including Ill., Ind., Ky., Ohio, W. Va., Pa., and N. Y.)	110,500	111,000
Decrease		500

Indiana Jobbers Plan Collective Advertising; Adopt Emblem

By Ward K. Halbert
N. P. N. Staff Writer

INDIANAPOLIS, Dec. 10

A PROPOSAL of a campaign of collective advertising for Independent jobbers, was the main feature of the annual meeting of the Indiana Independent Petroleum Marketers' Association here Dec. 10. This proposed campaign is to be intrastate although several state associations may undertake it individually, and is not to be confused as a part of the national "Spread Red Eagle" campaign of the Independent Oil Men of America.

The idea for the intrastate campaigns comes from the Executives' Club, a small organization of presidents and secretaries of state jobbers' associations. The purpose of the campaign is to allow jobbers in various states to tie up to their state organizations through common advertising emblems which feature the state association and play to the service of the Independent stations.

The Executives' Club has been working on the idea for nearly a year but plans were revealed for the first time at the meeting here. An exhibit of metal signs of the Indiana state emblem, and other advertising devices was arranged in the Hotel Severin here by Sam Hurd, secretary of the Indiana association. The proposed campaign was explained by Wayne C. Hughes, secretary of the Michigan Independent Oil Men's Association.

Features of Movement

WITH charts and pictures Mr. Hughes emphasized the power of an organization of men with identical aims; the sales value of an emblem; the business-building influence of uniform quality and similarity of service; the advantages of a coupon exchange and the possibilities of such an arrangement to meet Q. D. A. problems; the advantages of mutual advertising, and the economies of collective purchasing. The kernel of the whole business was to put the Independent local jobber on an equal competitive basis with large oil companies in the field.

Here are features of the new campaign as outlined:

1. The new movement is to cost only $50 a year for each 500,000 gallons the member sells, with a prescribed maximum annual cost of $500 a member.

2. The new system is entirely local of intrastate in its organization and control; although being considered in several states, each state will handle its own affairs.

3. The organization, under the new proposal, will make no effort to stipulate the source from which its members buy their merchandise but will uphold high standards of quality.

Emblem of Indiana jobbers

4. The new emblem is orange, black and white in color; is a border of two concentric circles with the outline of the state inside. The signs will read "Buy at this sign in Indiana" or "Buy at this sign in Michigan," depending on where the sign is erected.

At a meeting of Indiana jobbers some months ago the proposed emblem was shown, examined by the jobbers, popularly commented upon by the members and approved by the directors. There was no official action to take at this meeting but a number of the oil men commented favorably upon the idea and others placed orders for metal signs and decalcomania with Mr. Hurd.

The chief index to the idea's popularity developed at the election of officers which resulted in the choice of two men who most strongly advocated it in open meeting; W. D. Cross, Geneva, and J. B. Gafill, South Bend.

The Official Program

THE principal address of the convention was delivered by C. C. Fredericks, president, St. Louis Pump & Equipment Co. He declared that the method of selling gasoline had not changed materially since the first automobile traversed the roads of Indiana, when it was sold in five-gallon cans, two cans to the crate and the motorist carried his reserve supply tied to the running board with a string.

"Oil salesmen, particularly those at filling stations, still know little or nothing about the products they sell," Mr. Fredericks pointed out. "Ask any station attendant why the price of gasoline went up 1 cent, and the answers may be humorous, ridiculous or asinine, but never correct.

"The public is not a fool; the public does not want something for nothing; the public does not have time to become expert in petroleum technology," he continued. "The public buys gasoline like I do. I buy from a man in whom I have confidence; a man I know knows his business and does business honestly.

"But I do not have to be an expert in some line to tell whether a business man is an expert in that line. I can look at his place of business and tell whether he is an oil substituter or a gasoline bootlegger. You can do the same thing. We do not buy other things on a price basis, why should we buy gasoline for price only.

Truck Man Talks

TOM SNYDER, secretary of the Motor Truck Association of Indiana, talked about revenue for road building, offering for the oil men's approval a new plan to raise the needed $15,000,000 a year for road construction and maintainance. His main point was that freight and passenger trucks today are bearing a disproportionate share of the tax burden under the provisions of the vehicle license tax.

He argued that the vehicle license tax was unfair because all pleasure cars of like horsepower paid the same fee irrespective of how much they used the roads, and pointed out that 65 per cent of the trucks in Indiana did not use state highways but, nevertheless, paid a heavy state road tax as well as a municipal tax to maintain the pavement of the town where they operate. He admitted that trucks, using unpaved roads, were harder on the roads than lighter cars but would not concede they were harder on well-constructed pavement.

His proposal was, in brief, that the state kill the vehicle license tax entirely, fix a nominal fee on registration to cover actual cost of registering cars, and raise the $15,000,000 from gasoline tax. He said he believed it could be done with Indiana's present 3-cent gasoline levy.

M. E. Noblet, secretary and manager of the Hoozier State Automobile Association, spoke about highway management and police regulation. He was followed by Judge Raymond Springer of Connorsville, an entertaining orator, who has attended to incorporation of the Indiana Independent Petroleum Marketers Association. It is officially the I.I.P.M.A. Inc.

Oklahoma Production Highest for Year

By A. F. Hinton
N. P. N. Staff Writer

TULSA, Dec. 11

OKLAHOMA crude production increased 17,010 barrels the past week, and hit a new peak for the year, averaging 564,625 barrels daily, according to National Petroleum News estimate. Seminole, which came back strong after a lull of several weeks when the shut down agreement was in force, passed its previous high production mark, and turned in an average of 130,325 barrels daily over the week. Thus it was the principal factor in the large increase recorded by the state as a whole.

Several large wells and a number of others not so large were added to the list of Seminole completions during the week, bringing its production up to 136,413 barrels Dec. 9, the highest figure it has yet reached. Its previous peak was about 120,000 barrels, this having been its output Nov. 1. It declined somewhat during the last two days of this week, and today is making 131,663 barrels, from 104 completed wells, not all of which are producing. The Wilcox sand wells, 51 in number, are producing 123,419 barrels.

One of the best of recent Seminole wells was the Amerada Petroleum Corp. No. 2 Fixico, in the SEc NE of 23-9-6, a quarter-mile east of the same company's No. 1 Killingsworth, which was the first well in section 23, and which held the fort alone for more than 60 days while about 50 wells were drilling around it. The new well made 5800 barrels in the Wilcox sand from 4138 to 4147 feet. The Amerada's No. 2 Killingsworth "A", in the NEc SW NE of 23, got the Hunton lime at 3999 feet and was drilling at 4045 feet at last reports, making 440 barrels daily. It is drilling ahead to the Wilcox sand.

Other Big Wells

THE Amerada got another big well in its No. 3 Fixico, in the NEc SE NE of 23, a quarter-mile north of No. 2, mentioned above. This well topped the Wilcox at 4210 feet and at total depth of 4226 feet is making 5513 barrels daily. The same company's No. 1 Rentie, in the SEc NW NE of section 23, is making 200 barrels from the Hunton lime topped at 3905 feet and is drilling ahead for the Wilcox.

In the Searight pool, northwest of Seminole proper, F. J. Searight drilled in his No. 4 Youngblood, in the SWc NE SE of 33-10-6. Getting the Wilcox sand at 4355 feet, it was flowing 120 barrels an hour after reaching total depth of 4365 feet or 10 feet in. Carter Oil Co. No. 1 Stewart, located in the SWc NW SW of 34-10-6, also in Searight, is flowing 80 barrels an hour in the Wilcox sand topped at 4280 feet and penetrated one foot.

Southeast of production in Seminole, a semi-wildcat that has been closely watched apparently is showing for only a light well. This is Gypsy Oil Co. No. 1 Frazee, in the SWc NE SW of 36-9-6, a mile east and a half-mile south of farthest south Seminole production, this being the Superior Oil Corp. No. 1 Cudjo, in 35-9-6. The Gypsy well got the Wilcox sand at 4126 feet and at 4145 feet made 50 barrels in the last 24 hours. It may make a

Drilling Operations in Okla., Kan., N. Texas and N. Mexico

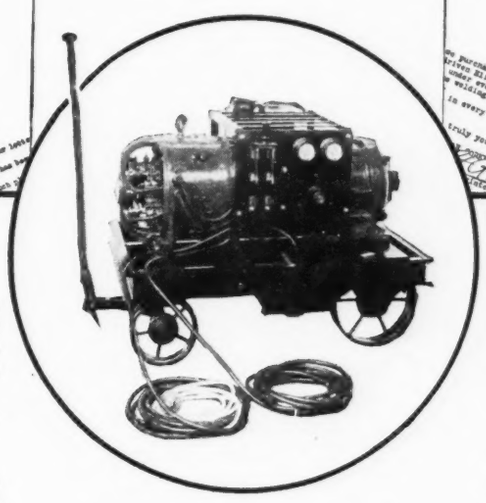
	Dec. 11 Week Ended					Dec. 4				
OKLAHOMA	Loc.	Rigs	Drg.	S.D.	Total	Loc.	Rigs	Drg.	S.D.	Total
Burbank	3	13	39	1	56	5	12	38	...	55
Other Osage	9	10	55	8	82	13	8	62	4	87
Bristow-Cushing	13	18	121	12	164	14	16	117	16	163
North Oklahoma	8	23	106	44	181	13	22	107	40	182
South Oklahoma	28	29	163	45	265	33	32	177	40	282
Muskogee	..	13	42	12	67	...	12	55	15	82
Okmulgee-Bristow	1	46	139	27	213	1	53	154	25	233
Tonkawa	1	...	10	2	13	1	...	10	3	14
Seminole Dist.	29	56	348	32	465	25	54	331	23	433
Total Oklahoma	92	208	1023	183	1506	105	209	1051	166	1531
KANSAS	64	77	224	109	474	61	79	223	103	466
TEXAS										
Central Texas	..	108	198	145	451	...	89	224	113	426
East Texas	..	2	19	14	35	...	2	19	15	36
Panhandle	..	135	320	88	543	...	144	331	89	564
N. Central Tex.	..	73	132	42	247	...	76	137	53	266
W. Texas	..	112	156	65	333	...	99	198	51	348
Total Texas	...	430	825	354	1609	...	410	909	321	1640
GRAND TOTAL	156	715	2072	646	3589	166	698	2121	590	3637

Seminole Production By Leases, Dec. 10, 1926

Company	Lease	No. Wells	Prod.	Remarks
Amerada	Killingsworth	2	1,729	180 water
Amerada	Fixico	3	11,695	
Amerada	Rentie	1	0	Off
Amerada	James	1	0	Off
Total Amerada		7	13,424	
Barnsdall	Carter	5	5,500	3 wells making water
Carter Oil Co.	Frazier (Searight)	1	4,720	Cutting
Carter Oil Co.	Davis (Searight)	1	5	
Carter Oil Co.	F. Carter	2	1,500	
Carter Oil Co.	Grisso	1	1,690	
Carter Oil Co.	Carter "B"	2	515	
Carter Oil Co.	Carter, J.	3	3,390	
Carter Oil Co.	Stewart (Searight)	2	1,223	
Total Carter Oil Co.		12	13,043	
Gypsy Oil Co.	Carter, J.	3	640	2 making water
Gypsy Oil Co.	Fixico	5	1,344	#3 dead
Gypsy Oil Co.	Wolfe	2	3,671	#2 dead
Gypsy Oil Co.	Frazee (36-9-6)	1	0	Off
Total Gypsy		11	5,655	
I. T. I. O. Co.	Livingston	1	199	
I. T. I. O. Co.	James	4	1,808	
I. T. I. O. Co.	Reed	3	80	
I. T. I. O. Co.	Harjo	1	440	
I. T. I. O. Co.	Bowlegs	3	3,579	
Total I. T. I. O.		12	6,106	
Independent	Fixico	5	5,525	
Indep.-Interocean	Jones	3	2,200	
Total Independent		8	7,725	
Mid-Continent	Rentie	2	3,740	
Mid-Continent	Tayoche	4	4,340	#2, 3, 4 dead
Mid-Continent	Grayson	3	4,810	#4 dead
Total Mid-Continent		9	12,890	
Pure Oil	Strothers	5	12,591	#1 & 5 on air
Prairie O & G	Carter, J.	1	140	
Prairie O & G	Spencer	1	15	
Prairie O & G	Gross	3	225	
Prairie O & G	Strothers	1	5,585	18# back press.
Prairie O & G	Kinkade	4	11,980	#2 cutting
Total Prairie		10	17,945	
Sinclair	Carter, J	2	222	
Sinclair	Cudjo A	1	3,520	
Sinclair	Cudjo B	1	3,580	
Total Sinclair		4	7,322	
Transcontinental	Fixico	2	95	
Superior	Noble	1	15	
Superior	Cudjo	1	3,651	On air
Total Superior		2	3,666	
T. B. Slick	Franks	1	5,551	
F. J. Searight	Youngblood	3	6,800	
Tidal Oil Co.	Noble	1	0	Off
Tidal Oil Co.	Mayhardy	4	6,535	35 water
Tidal Oil Co.	Carter	2	30	#1 dead
Tidal Oil Co.	Tayoche	2	250	
Tidal Oil Co.	Fixico	4	6,535	
Total Tidal		13	13,350	
Total Field		104	131,663	

Wilcox sand 51 wells 123,419 barrels.

They O.K. Wilson Machines



The above is a Wilson Type S Single-Operator Motor-Driven Electric Welding Machine — designed for both production and repair work, and adapted for use wherever power is available. Its capacity is 25 to 250 amperes. Other Type S Machines include both single and two-operator units — gasoline-engine-driven, belt-driven and motor-driven — portable and stationary. Capacities, 25 to 200, 25 to 250, and 25 to 500 amperes.

Type S Features

Every Wilson Type S Machine has a simple, compact control panel; a *self-exciting* generator; an arc that is easy to strike and easy to maintain; a current adjustment by a simple turning of a field rheostat knob; a commutator that always shows *less temperature rise than any other part of the machine.* The welding current can be reduced to as low as 25 amperes for welding thin-gauge metals. These features—many of which are found in no other machine—make the Wilson Type S the choice for practically every kind of welding. And you can select just the right Wilson Welding Machine to meet your own particular operating conditions. Write today for full information and prices.

Save Money

Several years ago we purchased a Wilson Electric Welder. We use this machine daily and give it very hard service. It has been very satisfactory and saved us considerable money on castings.

Birmingham Machine & Foundry Co.

3 Years' Satisfaction

We have had a Wilson Arc Welder in operation here at our factory for approximately three years, and it has given us the best of satisfaction.

Crossley Machine Co. Inc.

A Good Investment

The Wilson Plastic Arc Electric Welding Machine purchased from you some time ago has given us satisfaction and we consider the investment a good one.

Imperial Oil Refineries, Limited

Wide Range — Close Control

We have had a portable Wilson Electric Arc Welding Machine about two years. This is a splendid machine and has given thoroughly satisfactory results. On account of the wide range and close control obtainable, we have found it particularly valuable for welding cast iron.

Sun Shipbuilding & Dry Dock Co.

Welds at Distance of 1000 Ft.

We have successfully used our Wilson Plastic Arc 200 Amp. gasoline-driven electric welder under every condition possible to use such a machine — on two or three occasions welding at a distance of 1000 feet from machine without loss of power.

Donovan-Corkery Logging Company

In Constant Use

Our Wilson Electric Arc Welder has been in constant use from eight to twelve hours per day since its purchase. We can recommend this machine very highly.

The Scranton Pump Company

10 Machines 6 Years Old

We have, as you know, many Wilson machines in practically constant use and ten of them over six years old. When we need a new machine you will hear the usual, "When can you ship?"

Hutton Welding Company

Bought Five More

The original Wilson Welding Machine you sold us about four years ago is still in service. The fact that we have since purchased three additional motor generator sets and two gas-driven units should be proof enough of our satisfaction.

The Weldmech Company

No Maintenance Expense

We are well satisfied with our Wilson Welder and consider it has been a good investment. It is nearly two years since we took delivery of this outfit, and with exception of regular inspection, cleaning, etc., there has been no maintenance expense to speak of.

Sherbrooke Railway & Power Company

Excellent Satisfaction

Our Wilson Welding Machine has been giving excellent satisfaction and we are very much pleased with it.

Hardie-Tynes Manufacturing Co.

WILSON WELDER & METALS CO. INC., WILSON BUILDING, HOBOKEN, N. J.

WILSON

WELDING MACHINES AND WELDING WIRE

Completions in Oklahoma and Kansas, Week Ending Dec. 11

OKLAHOMA

Caddo County

Company	Well	Location	Depth	Initial Prod.
Briscoe-Hall	2	NEc SW NW 1-5-9W	2050–2360	80

Canadian County

Company	Well	Location	Depth	Initial Prod.
Johnes	1	NEc 29-11-7W	T.D.2150	Dry

Carter County

Company	Well	Location	Depth	Initial Prod.
Magnolia	4	SWc NE SE 3-2-3W	2077–2530	120
Magnolia	1	NWc 22-2-3W	3309–3318	10
Magnolia	12	SWc SE 23-2-3W	3144–3215	5
Humble	1	SWc NE NE 16-2-2W	996–1031	47
Amerada	29	NWc SW SE NE 20-5-1E	1324–1358	50

Creek County

Company	Well	Location	Depth	Initial Prod.
Magnolia	4	SWc NE SW 30-15-8E	3220–3223	31M
Riverland	4	SEc NE NW NW 1-18-11	1880–1890	25
Riverland	6	CNL SW NW 1-18-11	2112–2114	200
Texas	3	NWc NE SW 1-18-11	2071–2087	75
Holmes-Burton	1	NEc 6-18-11	1787–1845	35
Day	4	NWc SW SW NE 6-18-12	1999–2004	75
Regal	30	NEc SW 6-18-12	2144–2155	20
Stover	1	SWc NW 10-17-10	2915–2951 OWD	12
Ted Ray	2	CSL SE SW 13-17-10	1825–1865	20
Wright	14	CNL NE NW 24-17-10	1826–1861	80
Tibbens	31	SEc SW NE 30-15-9	3610–3660	40
Tibbens	3	NEc NW NW 31-15-9	2296–2354	5
Johnson-Ashe	1	SEc SW 9-14-10	3329–3338	65
Prairie	52	NEc SE SE SW SW 5-18-7	2389–2515	15
Prairie	44	NWc SW SE SE 6-18-7	T.D.2510	15
Red Bank	6	SEc SW SW 9-16-8	T.D.4126	Dry

Comanche County

Company	Well	Location	Depth	Initial Prod.
Cherry-Couch	1	NWc SW 19-2-9W	T.D.1895	Dry
Westherimer et al	2	NWc 19-2-9W	T.D.2051	Dry

Garfield County

Company	Well	Location	Depth	Initial Prod.
Roxana	3	NW SE SW SW 18-22-3W	3648–3656	545
Sinclair	38	SWc NE NW 19-22-3W	2138–2155	35
Sinclair	37	NWc 18-22-3W	T.D.3080	Dry

Grady County

Company	Well	Location	Depth	Initial Prod.
Nicholas	3	NEc SE 27-5-8W	2050–2332	6M
Okla. Natl	1	NEc NW NE 34-5-8W	2102–2300	4½M
Watchorn	1	C NW NE 11-4-8W	2110–2280	2M
Carter	1	NWc NE SW 8-3-5W	1983–1990	140
Carter	1	SEc NW 8-3-5W	1840–1847	45
Gypsy	1	SEc SW NW 16-3-5W	1757–1805	1210
Carter	2	NEc SW NW 35-3-5W	1470–1473	50

Grant County

Company	Well	Location	Depth	Initial Prod.
Marland	1	SWc NW 36-28-3W	4340–4351	135

Hughes County

Company	Well	Location	Depth	Initial Prod.
Amerada	10	SEc NE NW 5-7-8E	4173–4189	2235

Kay County

Company	Well	Location	Depth	Initial Prod.
Comar	3	NWc SW SE 16-29-1W	3450–3482	2097
Marland	1	SEc NW 17-29-1E	2025–2050	5M
Polling et al	5	SWc NW SW 4-27-1W	3445–3447	160
Slick	1	NEc SW SW SW 35-25-1W	4017–4090	180
Comar	3	NEc SE SW SW 5-28-1W	T.D.2520	Dry

McClain County

Company	Well	Location	Depth	Initial Prod.
Becker et al	1	C NE NW 19-6-4W	T.D.3011	Dry

Muskogee County

Company	Well	Location	Depth	Initial Prod.
Price	4	SWc NW 29-15-15E	1563–1578	15
Vise et al	2	NEc NW SW 30-15-15	1386–1387	4M
Williams	5	NEc SW NW 17-15-17	1845–1852	2M
Tidal	6	C S½ SE NW 6-14-18	1196–1218	5
West	3	CNL NE NE 3-16-15	T.D.1049	Dry
Dooley et al	2	SEc 28-14-17E	T.D.1707	Dry

Okfuskee County

Company	Well	Location	Depth	Initial Prod.
Atlantic	1	SEc SW SE 35-11-9E	3133–3160	10M
Sinclair	2	NWc SW 36-11-9	T.D.3175	26M
Champlin	1	C E½ SW SW 14-11-11E	3347–3355	80
Kingwood	1	SWc SE 33-11-11	T.D.2969	Dry

Okmulgee County

Company	Well	Location	Depth	Initial Prod.
LeBean	4	C SE NE 22-15-11E	1760–1813	20
McMahon	2	CEL SW SE 9-15-12	2665–2674	115
Pine	1	NWc SE SE 9-15-12	2644–2660	140
Speary	5	NEc SE SE 12-14-12	2114–2128	20
Mussellen	1	NEc SE NW NE 19-14-15	1298–1950	12
Sheldon	1	NWc SE NE 32-13-13	1920–1948	15
Cumberland	6	SWc NE NW 21-13-14	1643–1663	10
Bright	9	CSL NE NW 25-13-14	1291–1311	10
Tiger Mtn	2	SWc NW NW 3-11-13	2025–2033	7½M
Le Bean et al	3	NEc NW SW 23-15-11	T.D.2842	Dry
McCulloch	3	SEc NW SE 16-15-14	T.D.2480	Dry
Kingwood	1	SWc NW SW 7-14-13	T.D.2745	Dry
Custer	7	SEc NE SW 19-15-14	2315	Dry
Haynes et al	4	NWc SE NE 32-13-14	T.D.2040	Dry

Osage County—Burbank

Company	Well	Location	Depth	Initial Prod.
Phillips	1	SWc NW 7-27-6E	2957–3007	143
Gypsy	2	SEc 28-27-6	2895–2951	955
Phillips	3	SWc SE SE 20-26-6E	2895–2940	75

Osage County

Company	Well	Location	Depth	Initial Prod.
Devonian	3	SWc SE SW 27-25-11E	1640–1746	12
Ind. Terr.	346	NWc SE NW NE 13-24-8	1941–1959	6M
Winona	7	CNL S½ SW 27-24-10	1356–1371	5
Peters	12	SEc 12-23-8	2070–2128	25
Twin State	9	NEc 13-23-8	2062–2123	40
Tidal-Osage	5	SWc SE NE 7-21-11	2045–2060	240
Kewanee	4	CNL 17-21-12	1308–1338	10
Blackwell	1	NWc NE SW 5-27-11	1874	Dry
Skelly et al	1	SEc NW 16-21-9	T.D.2994	Dry
Okla. Natl	761	NEc SW NW 20-21-11	T.D.1850	Dry

Payne County

Company	Well	Location	Depth	Initial Prod.
Mulberry	5	CSL N½ NW 5-17-4E	4187–4199	650
Shaffer	4	CNL S½ NW 5-17-4	4232–4238	225

Pontotoc County

Company	Well	Location	Depth	Initial Prod.
American	1	NEc SW 34-5-6E	T.D.2145	Dry
Ada Dev	1	NEc SE NE 4-3-6E	T.D.1450	Dry

Seminole County

Company	Well	Location	Depth	Initial Prod.
Tidal	4	SWc NE SW 24-9-6E	3919–3945	1720
Gypsy	6	SEc NE NE 26-9-6	4267–4283	100
Gypsy et al	1	SEc SW SE 21-9-7	3350–3353	50M
Prairie	2	NWc SE SE 33-10-6	4345–4358	7181
Searight et al	1	SEc NE 33-10-6	T.D.3470	Dry
Tidal	3	SWc NE NE NW 25-9-6	T.D.50	Dry

Sequoyah County

Company	Well	Location	Depth	Initial Prod.
Citizens	1	NWc SE NW 15-11-26	2264–2276	2M

Stephens County

Company	Well	Location	Depth	Initial Prod.
Fossett et al	1	NWc SW 19-1-8W	2160–2169	4M
Beard-Cobb	3	NWc SW SW 30-1-8W	1959–1985	200
Kidney	2	SWc SE NE 28-1-8W	T.D.2205	Dry
Winkler et al	2	SEc SW SW NE 28-1-8W	T.D.2750 OWD	Dry

Tulsa County

Company	Well	Location	Depth	Initial Prod.
S. S. Home	1	CNL S½ NE NW 1-19-11	2403	Dry
Riverland	3	CNL SW NE 34-19-11	T.D.2331	Dry
Hass et al	1	CEL NW NW 36-19-11	T.D.2500	Dry
Barnsdall	2	NWc SW NW 3-18-13	T.D.2205	Dry
Texas	1	SEc NW SE 18-17-14	T.D.1890	Dry
Superior et al	3	CNL NE NW 7-19-10	2015–2037	75
Wood et al	2	SWc SE SW 36-19-11	2145–2150	5
Tidal	1	NWc SE 12-16-13	1497–1521	25

Wagoner County

Company	Well	Location	Depth	Initial Prod.
Sevreda	1	SWc 36-18-16	T.D.1195	Dry
Smith et al	2	NE NW NE 20-18-15W	1204–1225	2M

Woodward County

Company	Well	Location	Depth	Initial Prod.
Small et al	1	NEc NW 34-20-20W	T.D.3791	Dry

KANSAS

Butler County

Company	Well	Location	Depth	Initial Prod.
Empire	166	SWc NW NW 8-25-5E	2423–2473	50
Empire	80	SWc NE SW 33-25-5E	2537–2539	5
Empire	73	NEc SW SW 17-26-5	2549–2559	75

Chase County

Company	Well	Location	Depth	Initial Prod.
Sinclair	1	SEc 25-21-9	2242–2270	70
Preston et al	3	C SW NE 29-18-7E	T.D.1080	Dry

Cowley County

Company	Well	Location	Depth	Initial Prod.
McNabb et al	1	CNL SE 15-32-4E	T.D.2690	5M

Elk County

Company	Well	Location	Depth	Initial Prod.
Benge et al	1	C NE NE 14-31-9E	1259–1267	½M
Union	18	SWc SE NE 14-31-10	1616–1633	200
Union	1	NWc NE 23-31-10	1244–1246	½M

Greenwood County

Company	Well	Location	Depth	Initial Prod.
Sinclair	50	C NE SE 19-22-10	2261–2336	170
Sinclair	49	C N½ SW SW 20-22-10	2239–2295	120
Syndicate	7	NEc SE NE 28-22-11	1945–1960	35
Syndicate	8	SEc NE NE 28-22-11	1945–1956	20
Texas	1	NEc SE NE 9-22-12	1795–1828	150
Skelly	1	NWc NE 32-22-13	1692–1726	200
Tidal	11	NWc SW NW SE 15-23-13	1765–1810	20
Phillips	5	SWc SE SE 25-24-10	1850–1878	35
Theta	3	NEc NW NW 31-24-11	1892–1904	225
Polhamus et al	1	NEc SE SE 34-25-10	1995–2015	15
Leonard	1	SWc NE NW 1-23-10	T.D.2200	Dry
Darby	6	SEc NW NE 17-23-11	T.D.2158	Dry
Katoma	1	SEc 34-23-13	T.D.1821	Dry
Abel et al	1	SEc SW NW 3-24-11	T.D.2047	Dry

Lyon County

Company	Well	Location	Depth	Initial Prod.
McCullough et al	1	NWc SE 25-21-10	2216–2219	600
Transcontinental	11	NWc SW 30-21-10	2229–2283	100

Rice County

Company	Well	Location	Depth	Initial Prod.
Prairie	3	NWc NE SW 35-20-6E	3401–3508	40

Russell County

Company	Well	Location	Depth	Initial Prod.
Wilcox	1	SEc SW 14-12-13W	T.D.3561	Dry

larger well with further penetration into the sand.

Tidal Gets Good Well

TIDAL OIL CO. drilled in its No. 5 Fixico during the week, and has it flowing 90 barrels an hour through use of gas lift. This well, which is located in the NWc SE NW of 26-9-6, is in the Wilcox sand from 4103 to 4160 feet. It is a quarter-mile west and the same distance north of the Independent-Garland discovery well in the Wilcox sand. Tidal's No. 2 Tayoche, in the NWc NE NW of 25-9-6, apparently an edge well, is in the Hunton lime from 3988 to 4011 feet and is flowing about 250 barrels. The same company's No. 6 Harjo, in the SEc SW SE of 23-9-6, had the Hunton from 3986 to 4001 feet and is drilling ahead at 4045 feet with 2500 feet of oil in the hole.

Another good well in the Searight area was drilled by the Carter Oil Co. in its No. 1 Frazier, located in the NWc of 3-9-6. This well topped the Wilcox sand at 4330 feet and at six feet in was making 4050 barrels, of which about 1000 barrels are coming from the Hunton lime.

Gypsy Oil Co. No. 8 Fixico, in the

ANNOUNCEMENT

Concentration of Sludge Acid can *now* be accomplished *Satisfactorily*—that is

to HIGH STRENGTH
in ONE STAGE
with LOW COST and
with HIGH YIELD

WITHOUT Packed Towers
Electrical Precipitators
High Speed Blowers
Barometric Condensers
Vacuum Pumps, or
Other Objectionable Apparatus

AVOIDING Fume Nuisances
Clogging of Apparatus
Pumping Acid in Process
High Heat Losses
High Maintenance Expense
Filthy Product

The Geyser-Action Process

(Using Skoglund's Acid Concentrator)

which was widely employed in the past by the United States Government, the British Government and many others for Concentrating Clear Sulphuric Acids and various collateral purposes, has been greatly improved and has been adapted to the Concentration of Petroleum Sludge Acids — which it performs with extraordinary success.

Patented and patents pending

To Refiners who are interested: we will furnish full particulars and show the Process in operation.

GEO. F. HURT ENGINEERING CORPORATION

52 VANDERBILT AVE.,
NEW YORK CITY

Completions in N. C. & E. Texas & Panhandle, Week Ending Dec. 11

Company	Well No.	Location Survey	Depth	Initial Prod.
Archer County				
Magnolia	7-Hudson	Harris	1163–1173	34
Roxana et al	1	Netherton	T.D.1705	Dry
Gywnn	1-Wilson	Harrits	T.D.1519	Dry
Burns	1-Turberville	Carson	T.D.1590	Dry
Burns	1-Andrews	Carson	T.D.1522	Dry
Marland et al	1-Turberville	Carson	T.D.1552	Dry
Tidal	3-Turberville	Carson	T.D.1522	Dry
Tidal	4-Turberville	Carson	T.D.1500	Dry
Consolidated	2-Kinder	CP	T.D.1533	Dry
Humble	1-Roy	Harris	T.D.1551	Dry
Brown County				
McLester	1-Brown	McCloin	T.D.1502	Dry
Brown	3-Gaines	Swain	T.D.1366	Dry
Hones et al	1-DeBuske	Mitchell	T.D.2400	Dry
Humble	2-Armstrong	Delgado	1250–1224	300
Kone	10-Foster	Benson	1184–1196	190
Kone	12-Foster	Benson	1200–1225	150
Texas	7-Hickman	Benson	1166–1180	10
Cosden	4-Westerman	Mitchell	1237–1266	210
Gilman et al	8-Teston	Smith	1173–1209	50
Gilman et al	10-Moore	Smith	1165–1197	200
Gillespie	1-Newton	Travis	1319–1329	5
McLester	17-Wooldridge	ET	1215–1235	90
Moore	9-Wooldridge	ET	1215–1235	200
Williamson et al	9-Keller	Mitchell	1145–1174	5
Amerada	6-Fry	Stubblefield	1306–1313	43
Gibson	1-Shore	Ryhne	1220–1248	50
Lester	13-Fry	Chandoin	1314–1329	250
Hughes	1-White	Vernon	1211–1233	50
Texas	2-Pugh	Pugh	1307–1322	54
Callahan County				
Green et al	1-Rudolff	Comal		
Carson County				
Magnolia	3-Burnett	I&GN	2975–3000	18M
Cherokee County				
Humble	1-Templeton	Oliphant	T.D.3447	Dry
Coleman County				
Altitude	1-Dibrell	H&TC	T.D.2107	Dry
Cranfill et al	1-Gubson	Crockerson	T.D.1880	Dry
Westheimer et al	1-Taylor	GH&H	T.D.2503	Dry
Cooke County				
Continental	1-Marshall	BBB&C	T.D.2505	Dry
Stahl-Lynch	1-Miller	Ivey	T.D.2128	Dry
Crockett County				
Humble	1-Powell	GCSF	2644–2673	152
Eastland County				
Parsons et al	1-Robinson	McLennan	3095–3160	3M
Tex-Fidelity	1-Walker	Hickman	T.D.1725	Dry
Gray County				
Gulf	1-Holmes	I&GN	3080–3232	20
Magnolia	15-Merton	I&GN	2997–3001	90
Pure	3-Benton	I&GN	3115–3126	30
Shamrock	3-Merton	I&GN	2052–3131	137
McMan	3-Worley	I&GN	2972–2997	70
Phillips	1-Davis	I&GN	3108–3150	1189
Haskell County				
Kouri	2-Ballard	Carson	T.D.4017	Dry
Howard County				
Marland	4-Chalk	Bk. 29	1618–1648	105
Reeves et al	1-Clay	WNW	1594–1606	30
Hutchinson County—Panhandle				
Gulf et al	36-Dial	GCSF	2896–2938	500
Gulf et al	37-Dial	GCSF	2925–2958	240
Marland	1-Christian	Anglin	2890–2904	200
Marland	2-Christian	Anglin	2910–2930	175
Marland	4-Christian	Anglin	2947–2977	300
Marland	1-Johnson	H&TC	2668–2769	300
Gulf	5-Whittenburg	Blk 46	2710–2750	5
Phillips-Dorsett	2-Johnson	H&TC	2673–2774	70
Phillips-Whitt	1-Whittenburg	H&TC	2732–2812	10
Phillips-Whitt	2-Whittenburg	H&TC	2722–2775	10
White Eagle	3-Johnson	H&TC	2729–2755	100
Phillips-Gibson	2-Whittenburg	Whitley	2894–2929	400
Phillips-Elva	6-Whittenburg	Tomlinson	2803–2850	400
Phillips-Gibson	2-Whittenburg	HTC	2875–2944	645
Hughes	3-Kingsland	D&SE	2875–2903	180
Mid-West	2-Smith	Tynell	2860–2817	150
Palo Duro	6-Smith	M&C	2690–2753	100
Phillips	6-Smith	M&C	2860–2891	150
Phillips-Patten	6-Johnson	Whitley	2829–2877	240
Hughes	1-Kingsland	TC	2773–2833	250
Dixon Creek	12-Smith	N&C	2810–2911	22
Hutchinson County				
Empire	8-Smith	M&C	2975–3023	133
Dixon Creek	7-Smith	M&C	2814–2815	200
Dixon Creek	11-Smith	M&C	2761–2813	236
Dixon Creek	28-Smith	M&C	2886–2979	430
Dixon Creek	35-Smith	M&C	2725–2789	63
Skiatex	7-Kingsland	M&C	2712–2850	280
World	1-Jackson	H&GN	2255–2280	300
Jack County				
Seaboard	3-Cullers	Chairs	T.D.2094	60
Limestone County				
Transcontinental	6-Midlock	Varella	2414–2808	30
Moss et al	2-Thompson	Varella	2996–3016	340
Mitchell County				
California	7-Womack	TP	3064-T.D.	136
Zoch	1-Card	H&TC	T.D.3307	Dry
Montague County				
Gulf	2-Rowland	Votan	1095–1120	70
Gulf	6-Howard	Brd	T.D.1165	22
Cates	4-Rolls	Chambliss	1343–1387	75
F H & E	6-Howard	Chambliss	1343–1387	30
F H & E	7-Howard	Chambliss	1343–1344	30
Texas	3-Maddox	Thompson	885– 915	100
Continental	9-Boulding	Chambliss	1117–1121	121
Continental	6-Rowland	Chambliss	1070–1078	210
Continental	10-Howard	Chambliss	1334–1367	210
Continental	6-Jones	Donoho	T.D. 868	24
Commercial	1-Conger	Grimes	T.D.2000	Dry
Norwood	1-Cunningham	Singleton	T.D.1820	Dry
Navarro County				
Farris et al	1-Fullwood	Malone	T.D.1015	Dry
McDonald	2-McClelland	Ritchie	T.D. 606	Dry
Snowden et al	13-Kongbotham	Curry	T.D.1380	Dry
Scurry County				
Northwest	2-Wellburn	H&TC	T.D.3435	Dry
Shackelford County				
Moore	1-Nail	ET	T.D.2002	Dry
Logan et al	1-Gregg	BBB&C	T.D.2152	Dry
Carter	4-Nail	ET	T.D.2030	Dry
Carter	5-Nail	ET	T.D.2006	Dry
Smith	1-Vickers	Eggelston	T.D.2287	Dry
Gallager et al	1-Hart	TEL	T.D.1505	Dry
Humble	16-Cook	ET	1370–1383	50
Humble	13-Cook	ET	1361–1378	50
Humble	14-Cook	ET	T.D.1338	240
Humble	15-Cook	ET	T.D.1378	150
Humble	2-Cook	ET	1119–1136	50
Humble	4-Cook	ET	1111–1132	50
Rosier-Pendleton	17-Cook	ET	1305–1325	500
Rosier-Pendleton	19-Cook	ET	1320–1334	160
Rosier-Pendleton	7-Moberly	TP	1140–1160	20
Hope	4-Reynolds	TP	1289–1298	215
Hope	5-Reynolds	TP	1212–1225	40
Throckmorton County				
Humble	1-Graham	TEL	1709–1725	357
Cranfill et al	1-Davis	CIR	T.D.1605	Dry
Overlease	1-Mathews	CIR	T.D. 500	Dry
Upton County				
Marland	1-Estep	MK&T	2329–2359	30
Rio Grande	1-Estep	MK&T	2392–2395	60
Marland	32-Burleson	Jones	2182–2205	80
Wilbarger County				
Murchison et al	1-Fluhan	H&TC	1481–1483	155
Phillips	9-Waggoner	H&TC	2396–2408	30
Roxana	2-Waggoner	H&TC	T.D.2545	106
Barnes	1-O'Neil	H&TC	1729–1732	40

NWc NE NE of 26 on a lease which apparently is all in the syncline and contain's the field's lowest well on the Wilcox sand, drilled into water at 4171 feet. It was plugged back to 4169 feet, shutting off the water and has 1500 feet of oil in the hole. The same company's No. 5 on this lease, in the NEc of 26, was five feet in the Wilcox topped at 4207 feet, at last reports, and had nothing showing.

Garfield Wildcat

ONE of the most interesting wildcat tests in the state at present is the Marland Oil Co. No. 1 Looman, located in the NEc SE of 9-20-4W, Garfield county, about 10 miles south and two miles west of the Garber field. This well topped the Layton sand at 4597 feet and had its first show of oil at 4617 feet. It was drilled to 4624 feet, and in 24 hours after reaching that depth, oil in the hole had risen to 3500 feet. There being almost no gas, the well was swabbed, and it made one flow after the third trip of the swab.

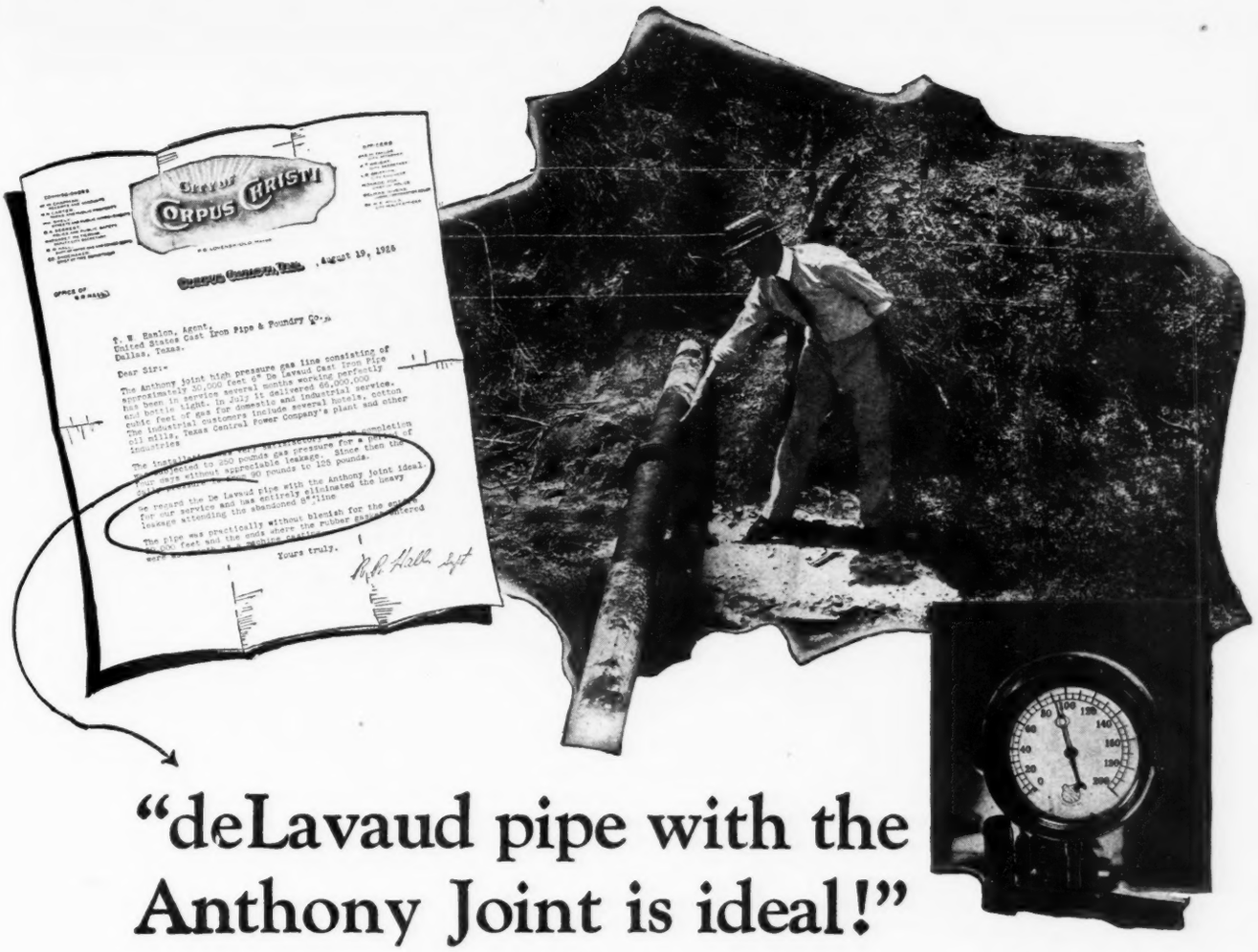
It made 120 barrels the first 24 hours, 140 barrels the second, 41 barrels the third, and 60 barrels the fourth. After this day's swabbing, the oil apparently ceased rising in the hole, and water showed up. At last reports the well was to be drilled deeper. The oil tests 39.2 gravity. In this test, the 8¼-inch casing was set at 4544 feet. In the Garber field, the Layton sand is found at about 3500 feet.

Marland Oil Co. No. 1 Garber, in the NWc SE of 19-23-3W, just outside the town of Garber, and about four miles north of production in the field of that name, is estimated to be making 16 to 18 million cubic feet of gas in the Wilcox sand at total depth of 5244

Production During Week

Seminole production for the past five days has been as follows:

Date	Entire Field Number of Wells	Entire Field Production	Wilcox Sand Number of Wells	Wilcox Sand Production
Dec. 6	97	126,505	47	111,212
Dec. 7	99	126,940	48	112,400
Dec. 8	101	130,679	49	113,614
Dec. 9	103	136,413	51	122,049
Dec. 10	104	131,663	51	123,419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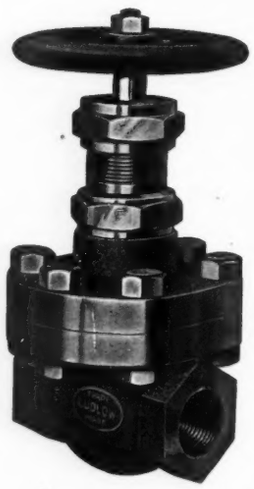

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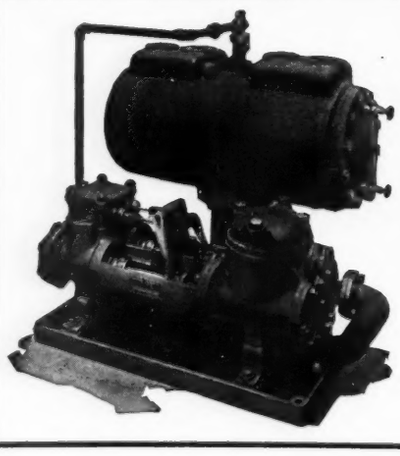

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feet. This well got the Wilcox from 5072 feet to 5116 feet, followed by a break of 16 feet, and back into the Wilcox from 5132 to 5242 feet. The sand was therefore 154 feet thick, except for the 16-foot break.

Oklahoma's Deepest Hole

IN this general area, the deepest hole in Oklahoma is drilling at 5805 feet, this being the Roxana Petroleum Corp. No. 1 Brunken, in the SWc NE of 29-23-4W, Garfield county, northwest of the Garber field. This well got what is supposed to be the Mississippi lime at 5070 feet, and is still in it at its present depth.

The J. I. Cromwell test, just north of Oklahoma City, which caused some excitement last week with a reported oil showing, is now being guarded by sentries and no one is permitted to visit the well, which does not make the test look any more important. The test, which is located in the SWc SE of 10-12N-3W, has a hole full of water, with a showing of oil through the water from 4358 to 4374 feet. It got another sand at 4381 feet, and was drilled to 4383 feet. Casing was lowered to shut off water and they are now bailing for a test. The well is reported to have made one five-minute flow while tools were being withdrawn.

Kansas Activities

MARION COUNTY, KANS., came in for its share of attention during the week with a new well 18 miles from production. This was the Franks et al. No. 1 Raznicer, in the SWc NW of 22-17-4E. This well topped the chat formation at 2573 feet, with first oil from 2391 to 2397 feet, which is its present total depth. A nine-hour pumping test indicated the well is good for about 60 barrels a day, with some water showing. The oil tests 37 gravity. It is likely that a number of tests will be put down in the vicinity of this well, but probably not until next spring.

In the Churchill pool, Sumner county, the past week saw some interesting developments. Roxana Petroleum Corp. No. 1 Riverbed, located on a lease acquired from the state in section 25-31-2E, had sand from 1825 to 1841 feet, where the hole filled up 1700 feet with oil in two hours. Some time after having been drilled in, the well started flowing on its own accord and is now estimated to be good for 2000 barrels daily. This is the 13th producer in the Churchill field, and brings the production to more than 13,700 barrels daily.

Two other good wells in the Churchill field were the Roxana's No. 1 Wanrich, in the NEc NW of 26-31-2E, and Wentz Oil Corp. No. 3 Herrick, in the center of the west line SW SE of 25-31-2E. The Roxana well was shot with 40 quarts and made 1760 barrels and the Wentz well, with the same size shot, made 1782 barrels the first 24 hours.

New Methods Developed for Applying Foam to Oil Tank Fires

TULSA, Dec. 10.

THE oil industry's methods of fighting tank fires with foam solutions will likely be very materially modified as a result of developments announced at the Fire Prevention session of the American Petroleum Institute meeting today by H. H. Hall, chief engineer of the Standard Oil Co. of California.

In delivering a paper on "Tank Fire Tests," Mr. Hall brought out that his company has devised equipment for applying the foam solution more efficiently to the burning oil surface. Patents have been applied for and Mr. Hall stated that the mixers and tubes which form the equipment will be available to the oil industry within the next month.

Mr. Hall stated it was possible these developments, arrived at after a series of tank fire tests on a 115 by 35 foot tank at the company's refinery at El Segundo, would do away with permanent installation of foam delivery boxes on tanks and bring in their place foam systems consisting of mains and hydrants only, with portable equipment for applying the foam to the oil surface.

Mr. Hall's paper, in which he tells in details of the tests and the use of this new equipment is given herewith:

Mr. Hall's Paper

JUST three days before the last meeting of the American Petroleum Institute, in Los Angeles in January of this year, a 115 ft. x 35 ft. storage tank containing 17 ft. of engine distillate burned at Standard Oil Co.'s refinery at El Segundo, a few miles out of the city. We did not have very much to say on the subject at the time, because we were somewhat disappointed by the fact that, in spite of being equipped with what we considered a first class foam system, we were unable to extinguish the fire.

Perhaps I should say right at the start that this foam system was not put in by the Foamite Co. though some Foamite equipment was used, and our chief fire protection engineer is an ex-employee of the Foamite Co. I might add also that we had foam protection systems in operation before any company specializing in this form of fire protection was organized.

The origin of the fire is not definitely known. The tank was modern in every respect, having a gas tight steel roof vacuum and pressure valves, and an emergency liquid seal hatch. It was one of the few around the refinery which contained a distillate with vapor pressure likely to produce a combustible mixture within the tank. It was being gauged at the time with a steel tape, and the resulting explosion blew the roof from the tank and caused the death of the gauger. The fire started at 8:52 a. m., and by 8

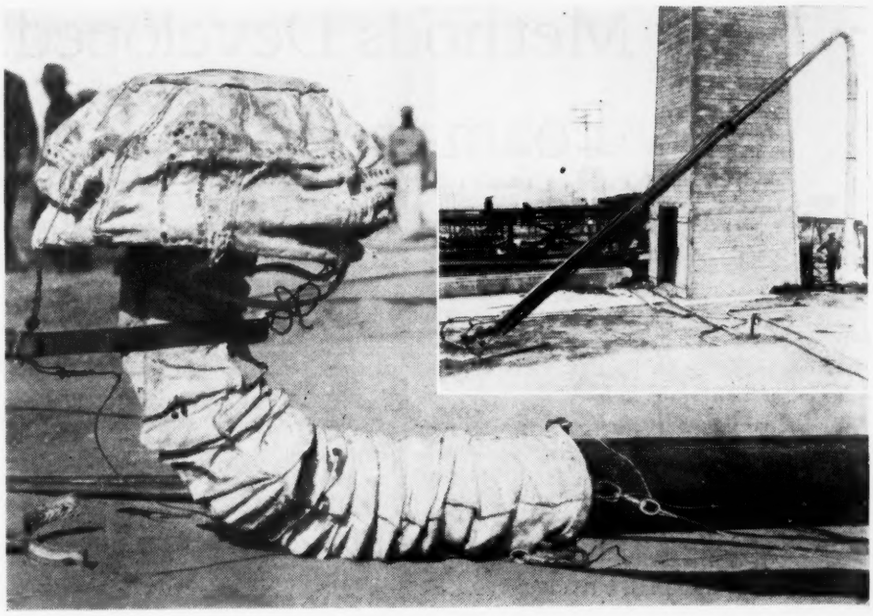
Airplane view of oil tank fire tests carried on by the Standard Oil Co. of California on a 115 foot by 35 foot storage tank at the company's refinery at El Segundo, a few miles out of Los Angeles. Two 80-foot observation towers erected to allow engineers to watch the progress of fire extinguishment are shown in the foreground. Another observation platform is shown at the right of the tank. (Photo by Rogers Airport)

minutes later, the refinery operators had the foam system in operation.

The tank had been equipped with two type LA Foamite mixing boxes. These are the large size late design. They were supplemented by the addition of special deflectors designed to insure that the foam would be guided against the shell in its downward journey. Immediately after the foam was turned on, it was observed that the box upon which the roof had fallen was discharging most, if not all, of its foam outside of the tank. The foam was therefore turned off from this box and the entire capacity of the system was put through the remaining box.

A test immediately after the fire showed that the rate of delivery was about 510 gallons of each solution per minute. This picture was taken about seven minutes after foam had been turned on. It shows plainly that some progress was being made; but that the progress was extremely slow and unsatisfactory is evidenced by the fact that pumping was continued into this box for 1 hour and 15 minutes. At the end of this time enough foam to cover the tank approximately 6 feet deep had been used (assuming a net expansion of 6) and the fire was still burning extremely fiercely with no indication of further progress being made. Under the circumstances the management decided that, either the mixing box had been damaged or that some other unknown cause was affecting the efficiency of the foam. They therefore decided to abandon for the time being foam application until such time as they could bring up some of our portable foam mixers and make an entirely new try at extinguishment.

For various reasons this new attempt was delayed for several hours; but eventually portables were brought up. Hoses were used to cool the shell and protect the men from the radiant heat. These portables are a type of equipment developed by our own forces, and it was demonstrated it is perfectly feasible to erect and operate them after a fire has begun. With this new equipment in place foam was again applied at the rate of 730 gallons per minute, and pumping was kept up for 31 minutes. Again indications of progress were observed at times, but they were far from pronounced and did not continue. This time enough foam was pumped on to make a blanket 3½ feet deep. As the foam stock was being seriously depleted and no further progress appeared to be made, it was decided to abandon further efforts to extinguish the tank and to allow it to burn itself out.



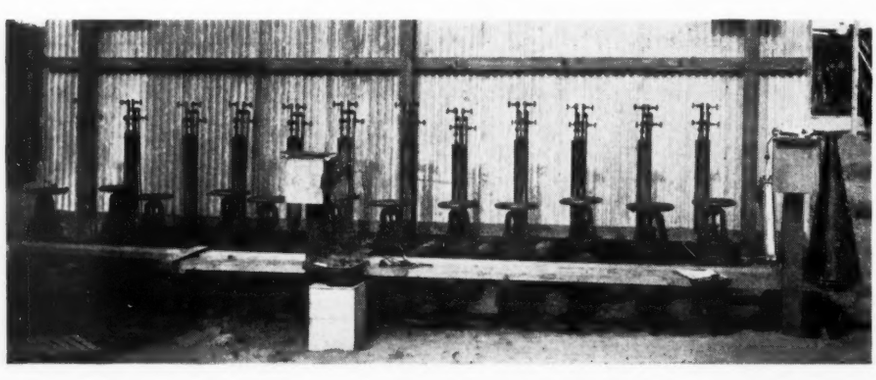
Asbestos extension tube devised by Standard of California as a result of its tank fire tests to attach to mixing chambers to apply the foam solution to the oil surface gently and from a point not far above the surface
Inset cut is asbestos extension tube extended and ready to apply foam solution to the oil surface

A review of the equipment and methods used in fighting the fire revealed no apparent fault. It was realized that the conditions prevailing at this fire might occur again at any time, and that, unless some method of successfully coping with them could be developed, the value of our foam protective systems would be seriously lessened. Our directors accordingly decided to make some large-scale experiments to determine why the tank had not been extinguished. The old shell was moved to a more convenient location. The bent sheets were straightened up until throughout most of the circumference of the tank it was 20 feet high and on two opposite sides it was raised to 25 feet high. In addition to that, a great deal of test equipment was put in place. Independent lines were run to each piece of apparatus, with an orifice meter on each line, so that information on the rate of flow was always available. Eighty foot towers were erected to permit observation of the progress of extinguishment inside the tank, and thermocouples were located in about 15 places inside the tank.

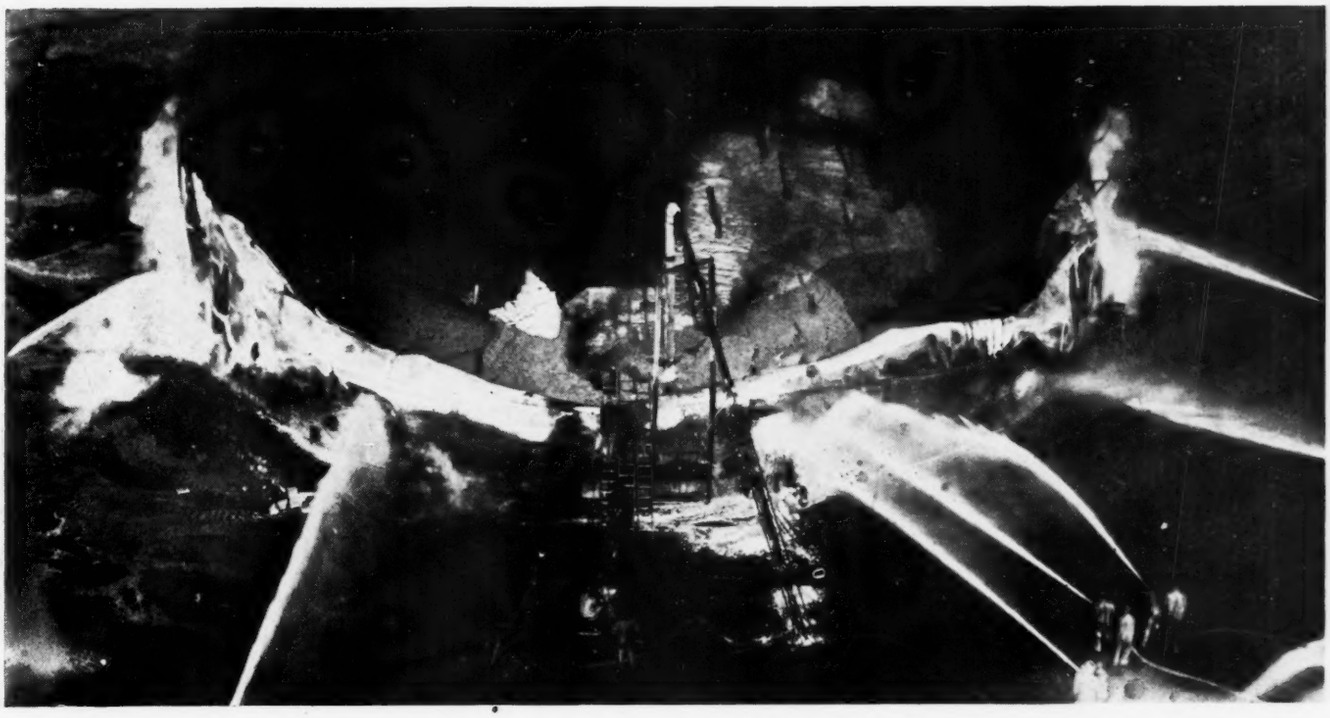
It was attempted in the first test to practically duplicate the conditions of the actual fire. The Foamite mixing box was therefore put in the place cocked over in the original fire, and the distance from the box to oil surface was made approximately 20 feet just as it had been.

Before putting any oil in the tank, foam was run through this box, and it was observed that the crooked position of the box did not affect the quality or the flow of the foam.

The test fire was allowed to burn for ten minutes, after which foam was applied at an average rate of 585 gallons per minute for 58 minutes,—and much higher rates toward the last. At the end of this tims the fire was out, but it had been a terrible struggle, and the method of extinguishment was not considered satisfactory from a practical standpoint. It should be borne in mind that, at this test fire, we had every advantage of complete preparation and observation, as well as the benefit of the experience of most of the experts of various kinds available in the corporation. These are conditions which cannot be expected to exist at the time of the ordinary fire; and even with these advantages, enough foam was used to put a blanket 5.2 feet deep over the tank before extinguishment was



Manifold and test equipment set up at the California Standard's test oil tank fire. Independent lines for discharging the foam solution were run to each piece of apparatus, with an orifice meter on each line to measure the rate of flow



The test fire in process of extinguishment. The fire is receding before the flow of foam applied through the portable equipment with the asbestos extension tube for applying the foam solution gently to the burning oil surface. This equipment is shown in the foreground immediately at the left of the point where the three lines of hose are playing on the tank wall

accomplished, some 33,000 gallons of each solution having been used.

Observation from both the towers and the ground indicated that foam which is allowed to drop any considerable distance into a fire undergoes the following losses:

A little is dried up as it falls through the heated atmosphere.

A considerably greater quantity is lost due to the up-draft of the fire swirling it out of the tank.

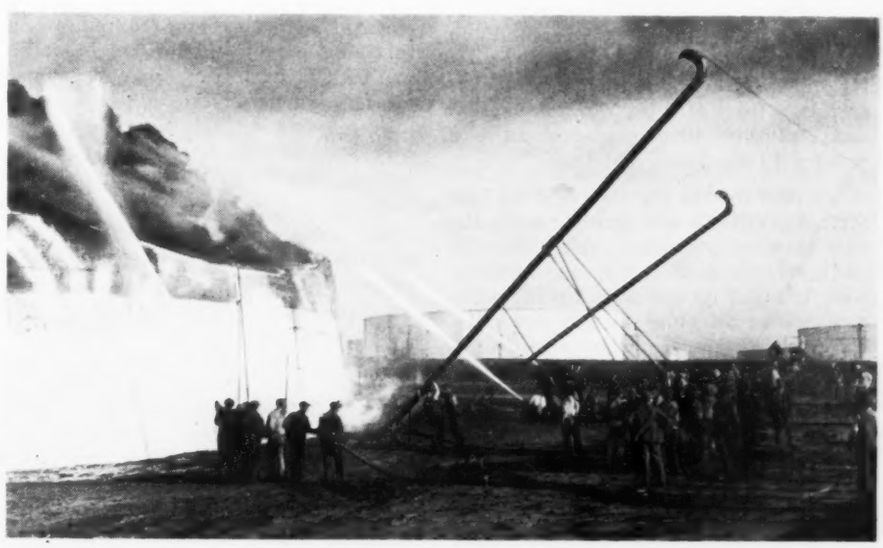
It should be borne in mind that this heat and swirling is the fiercest at the point where the foam is applied, because the falling foam splashes a great deal of oil into the air at that point. When the remaining foam with its high-falling velocity hits the oil surface, it is submerged. This submergence itself no doubt crushes some of the foam bubbles. Part of what remains then comes up into the turbulent and fierce-burning area immediately adjacent to where it went under. Most of this is probably consumed by the fire. Another part is forced some distance out under the oil before it comes to the surface. When it does come up, it is covered with an oil film, which has to burn off before an effective foam blanket is formed. It is easy to see that only a very small part of the original foam applied in this fashion ever does effective work.

In order to see whether this matter of the drop was the only serious difficulty, or whether there were other more important factors handicapping us, was decided to run a second test in which the foam would be applied close to the oil surface.

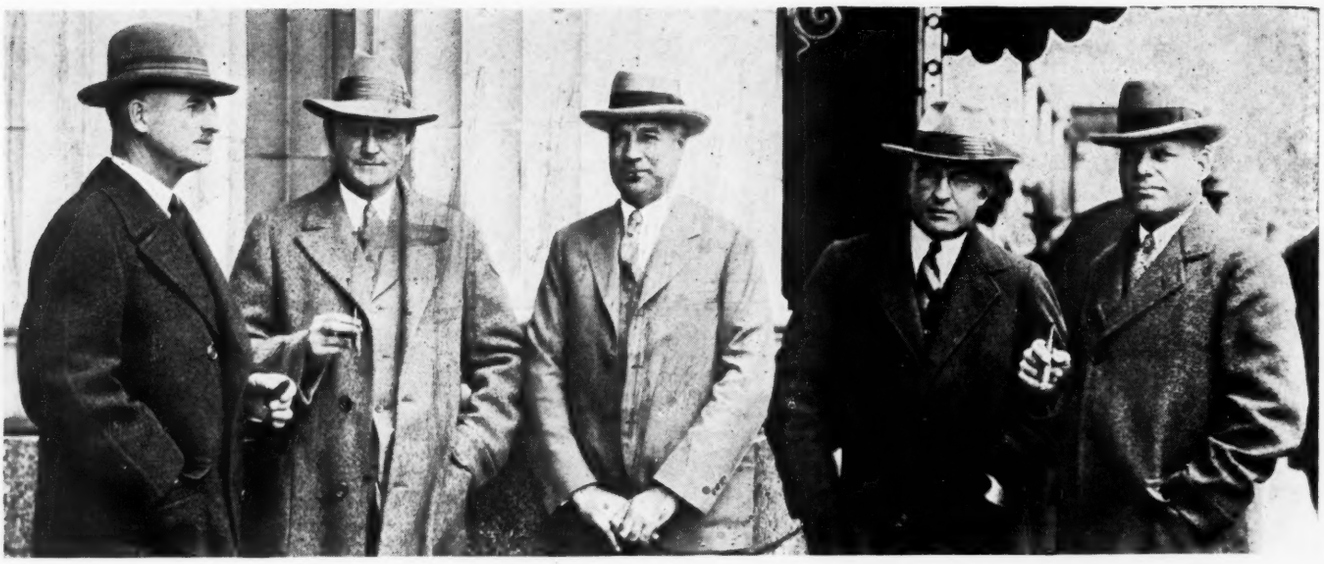
A hole was accordingly cut in the tank about 3 feet above the oil level and the mixing chamber lowered so as to discharge through that hole. Additional holes were cut at about the same elevation so that our portables could be given the same opportunity to operate with only a few feet of drop. In a later test we demonstrated that these holes can be readily cut after the tank is on fire.

As in the previous test, the fire was allowed to burn ten minutes before any move was made to extinguish it. At the end of that time, two portables were put in place through the side of the tank and about 400 gallons per minute of each solution were applied through them and an additional 400 gallons per minute through the permanent box. As was expected the foam applied in this way proved far more efficient—although even with this small drop the velocity was sufficient to splash the oil at the point of application and make it the hardest burning part of the tank and the last to go out. About 8400 gallons were used, enough to make a 1.2 foot blanket.

These two tests had definitely indicated that a long drop from the mixing box to the oil surface severely damages the foam, and may be so serious that it will be impossible to control the fire. We were all convinced that, to be in a position where we could confidently expect to extinguish all kinds of tank fires with our foam equipment, we must



Early portable equipment used by Standard Oil Co. of California to apply foam solution to oil tank fires, erecting and operating them after a fire has started



Officials of the Vacuum Oil Co. at the A. P. I. meeting. Left to right: W. C. Brower, vice president, New York; William A. Vinson, counsel; William B. Sutton, head of land department; Dilworth Hager, chief geologist, and W. C. Thomas, superintendent of production, the last four of Houston

devise some means of applying the foam in a comparatively gentle fashion and from near the oil surface. We accordingly spent about a month studying various possible schemes for accomplishing such a change in the method of foam application.

A great many plans were considered; but the one which appeared to be most feasible was to attach an asbestos tube to our portable mixers, on the bottom of which we proposed to hang something in the general shape of a dishpan either made of metal or asbestos. We figured that such an arrangement would protect the foam during its drop, would kill the velocity at the bottom and then release it at slow velocity and around a big periphery very close to the oil surface.

We accordingly built several of these tubes, and some 6 weeks after our first tests, ran a new series. In this series our first fire was used to check the previous results. A permanent mixing box was set 10 feet above the oil and tried as a check on the two previous tests. It agreed remarkably well, requiring a total of some 11,000 gallons of each solution, or enough to make a blanket 1.7 deep over the tank.

A new fire was then started, and an attempt made to extinguish it with the new type of portables. After the fire had gotten a good start, the portables were brought up and put in place without serious difficulty by the fire crew. The asbestos tubes released just as anticipated, but the results were entirely unsatisfactory, as the tubes broke almost immediately when the full load was put on. Altogether, three portables were erected and every one gave way somewhere. Of course they had been tried ahead of time for strength, but enough allowance had not been made for the weakening effect of the heat and the difficulty of getting both solutions started at once and so on.

After the new portables had failed, the fire was put out with the permanent mixing box set 10 feet above the surface, which had been used in the first of this series of tests.

We still had two of the asbestos extension tubes which had not been attached to our portable mixers. As the indications were that, made up as they were, they were of no value anyway, we decided to try them at the beginning of the next test. They were accordingly brought up and erected, and, while one of them broke at a seam part way down almost immediately, the other stayed intact and worked perfectly. For the first time in any of these tests the fire went out under the mixer almost immediately, and the foam spread from there crowding the fire ahead of it. Some damage was done by allowing foam to flow through the broken mixer which was located close to the effective one, this damage being caused by the splashing of the oil due to the falling foam. The final result was extinguishment in a generally smooth and orderly fashion using a total of 6000 gallons of each solution—by far the least used in any of these experiments up to that time.

We were now entirely satisfied that the tube extensions would accomplish what we thought they would, that they were perfectly feasible to erect after a fire was started, and that the only defect in our plans was the mechanical strength of the tubes. The original tubes had been built of wire-inserted asbestos cloth with no additional reinforcing of any kind. We accordingly designed some new tubes well reinforced with wire and tried them out.

The results were entirely satisfactory. Two fires just like the previous ones were extinguished with a single portable lowering the foam 20 feet through the asbestos tubes. The rate of application was only about 200 gallons per minute of each solution and the first fire was put out with a total of about 3300 gallons of each. In the second fire the tube was damaged little and 3700 gallons were used.

In this case the mixer was erected over a frame the top of which was 20 feet above the oil surface. This spot was chosen rather than the high side of the tank merely because of more favorable wind conditions.

We believe this method of foam application marks a distinct advance in the art. You will note the tests show that the basket method of delivery is not only far more efficient when there is a big drop for the foam but is also considerably more efficient than the permanent box, even with little drop. Immediately this brings up visions of possible future foam systems consisting of mains and hydrants only, with possibly smaller solution storage and smaller pumps and a more positive assurance of extinguishing the fire. Bear in mind also that the portables will be stored in a safe place and that they will escape the risk of being damaged by the falling roof.

We assume there will be a considerable demand for this equipment, but have not as yet decided on a definite policy for its manufacture and distribution. Needless to say, patent has been applied for and while it is not the desire of the company to make money out of the invention, we would like, if we can, to get back at least part of what has been spent in experiment. Granting an exclusive license to a manufacturer has been talked of and I am authorized to say that that or some other plan which will make these mixers and tubes available to the industry will be adopted within the next month.

Present Year's Discoveries Extend Probable Limits of Oil Producing Areas

By Paul Wagner
N. P. N. Staff Writer

TULSA, Dec. 13

THE limits of probable oil producing territory in Oklahoma have been extended farther beyond the limits of proven territory during the past year than at any time in five years, Luther H. White, of the J. A. Hull Co., Tulsa, told American Petroleum Institute members attending a symposium on the nation's petroleum supply, Dec. 9.

Two discoveries had important place in the considerations used by Mr. White to back up his statement that "when these areas are tested they will very likely extend the probable oil producing territory as much beyond the present limits as these areas themselves extend beyond the former limits."

Mr. White brought out that the oil companies in Oklahoma are today covering more new territory with checkerboard acreage, intensive geologic work and wildcat explorations than seemed possible a few years ago. This, he said, is all because of the discovery of entirely new lines of structural uplift.

A discovery of first magnitude was that made in Seminole and Pottawatomie counties, where the Seminole field has recently come to the forefront and where Earlsboro-Searight development is in the offing.

The territory surrounding the towns of Perry, Stillwater and Guthrie, in Noble, Payne and Logan counties is another area where, Mr. White said, geologic opinion has been favorably revised because of discoveries within the last two years. Mr. White's remarks in greater detail are subjoined.

Gas Lift Increases Yield

THE paper of C. R. McCollum of the Union Oil Co. of California, which was read for him in Mr. McCollum's absence pointed out that ultimate yields of Pacific coast producing areas would be materially increased because of the growing practice of restoring pressure to oil pay horizons through engineering methods such as the gas lift. No attempt was made to measure the increased recovery in terms of barrels of oil to be produced.

Wallace E. Pratt, director of the Humble Oil & Refining Co., and formerly its chief geologist, discussed the coastal plain area of Texas, Louisiana and Arkansas, segregating the salt dome division from the interior coastal plain in his detailed remarks about the general region. References were specifically made to such discoveries in the interior coastal plain as Mexia-Powell and Wortham fault zone production as discoveries of the last five years which indicate the future oil possibilities of vast untested areas. With regard to the saline dome area Spindletop's comeback to history-making production was mentioned as significant.

There are 51 known salt domes in the area from which this type of "structure" yields more or less of oil, excluding eight producing fields where drilling has not positively proved the existence of a salt core.

Salt Dome Yields

COLLECTIVELY, gulf coastal fields of this type, including 30 productive domes, have already yielded 400,000,000 barrels of crude petroleum. They have supplied 5 per cent of the nation's recovered oil to date, he said, and the area is now giving up about 8 per cent of the daily average production of the United States.

Mr. Pratt made no estimates of his own about the ultimate yield of the salt dome area as a whole, but cited estimates of the past, all of which were made by authorities in the industry and most of which already have been considered far too conservative. The latest estimate of three billion barrels ultimate to be recovered from such fields compares with 300,000,000 barrels as estimated in 1908 and 100,000,000 barrels forecast in the best estimates possible to make 10 years ago.

It was suggested that in the light of history one might take his own choice of upsets in estimates to come with the future, but there was no question about the highest "guesses," as Mr. Pratt called them, being made by conservative workers of competent judgment. The interior coastal plain, he ventured, should yield an amount of oil in the future comparable with the total to come from the salt dome division of the Gulf coastal province.

Rocky Mountain Territory

THE paper of Max W. Ball, Argo Oil Co., Denver, read in his absence by T. S. Harrison of Denver, dealt with the future of the Rocky Mountain territory. Aside from such freshly important areas as the Texas Panhandle and the Permian age salt basin of western Texas and eastern New Mexico, (in the western Mid-Continent) the paper discussed mainly the wildcatting possibilities of inter-mountain basins and structural basins underlying the high plains of western Kansas, Nebraska and the Dakotas. In many of these areas future production comes under the classification of unsolved problems of geology, but sedimentary beds are known to exist and their producing future must depend on their competency in relation to source rocks.

Potential Yields Shut-In

BECAUSE of the broad publicity given by this and other periodicals to developments in the Texas Panhandle and the West Texas-Eastern New Mexico salt basin, Mr. Ball's remarks about these areas will be passed over except to say that he estimated shut-in oil in the Panhandle at about 15,000 barrels potential production daily.

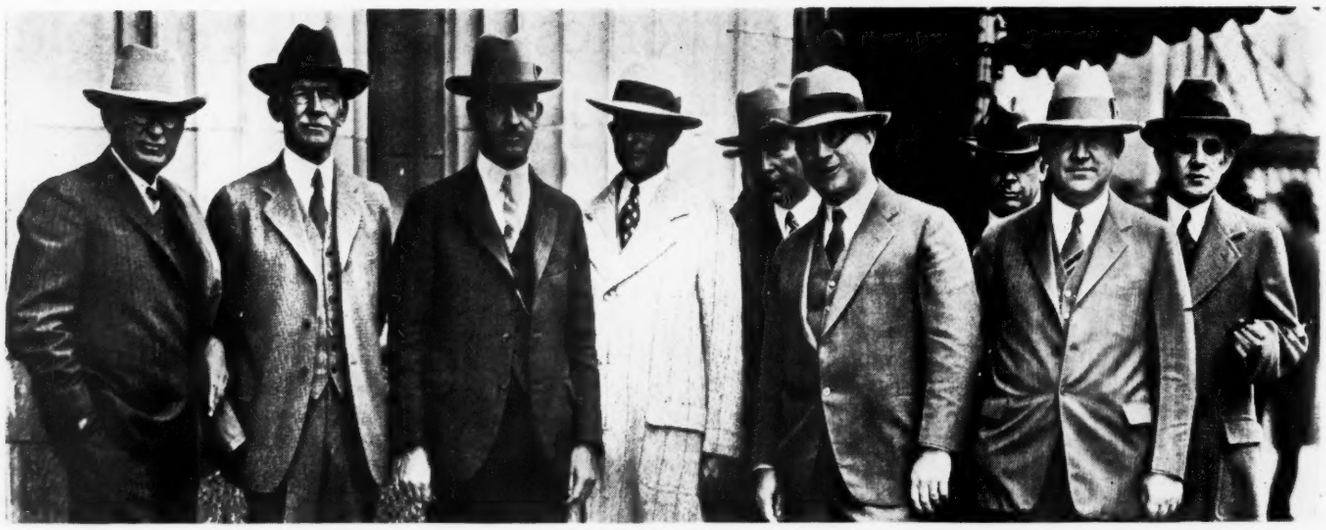
Mr. Ball said that about 100,000 barrels shut-in potential production exists in the Salt Creek field of Wyoming, where 70 wells in the Lakota sand have individual potentialities of 2000 to 4000 barrels, first 24-hour flows, if opened up. Two wells have been drilled into the deeper Sundance horizon, one testing at the rate of 6000 barrels, initial production. These two wells also are shut-in.

The Colorado River salt basin of Utah, in which the Cane Creek dome is located, near Moab, was described as an area of important possibilities. Three oil horizons have been penetrated in drilling on the Cane Creek dome, where he said a test had now penetrated 3000 feet into the salt. Parenthetically, the Colorado River salt basin is an area broadly comparable with the Gulf coastal saline dome territory of Texas and Louisiana and with the Permian age salt basin of western Texas and eastern New Mexico.

Conditions in the Colorado River salt basin are not as yet thoroughly understood, as Mr. Ball made the statement that other structures nearer its rim may be found later to be either domes or salt folds. The thought was left with those attending the symposium that data already disclosed are encouraging and warrant the hope of large future production, whether on crests or flanks of the domes was not clear.

Reverting to Oklahoma and Kansas developments of the future, as indicated to Mr. White, he said:

"The structural relations between anticlinal areas that were known in the past and certain discoveries within the past



Left to right: G. Clintwood, Wichita Falls producer; J. D. Collett, president, Texas division, Mid-Continent Oil & Gas Association, Fort Worth; Judge H. E. Bell, oil division, Railroad Commission of Texas; Adrian C. Moore, Houston division manager, Rycade Oil Corp.; Frank Cullinan, Republic Production Co., Dallas; Roy B. Jones, Panhandle Refining Co., Wichita Falls; T. H. Lawson, Continental Oil Co. of Texas, Wichita Falls; E. H. Eddleman, Continental Oil Co. of Texas, Wichita Falls; and Joe P. Laney, secretary, Texas division, Mid-Continent Oil & Gas Association, at Tulsa A. P. I. meeting

year are of such a nature as to bring enormous new areas within the limits of highly probable oil producing territory.

"The discovery of first magnitude along this line was that made in Seminole and Pottawatomie Counties. A few years ago this territory was regarded merely as possible oil producing territory. Previous to the discovery of the Wewoka pool the best thing that could be said about this territory from a structural standpoint was that it was probably located on the lowest part of an arch connecting the Arbuckle and Ozark uplifts. The lower Pennsylvanian and upper Mississippian series of sands were regarded as the probable lower limits of production and many men even doubted the possibility of reaching these sands.

"Because of the fact that the area was supposed to be synclinal between the Ozark and Arbuckle Uplifts most men believed the pre-Mississippian beds to be buried too deeply for exploitation. The structural attitude of these beds was regarded as unfavorable. This conception of subsurface conditions has suffered complete reorganization in the light of recent developments. The discovery of Wilcox sand production at Wewoka, Seminole City, Searight, and Earlsboro has shown that instead of this region being synclinal between the Arbuckle and Ozark regions, it is anticlinal. These pools together with certain structural relations discovered in southern Seminole and southeastern Pottawatomie Counties have brought on an intensive period of exploration work throughout these counties.

"The leasing campaign has extended far westward into McClain, Cleveland and Oklahoma Counties. These counties were looked upon as improbable oil producing territory previous to the astonishing geologic discoveries made in Seminole and Pottawatomie Counties. How much farther westward and southward this extension program may prove profitable is impossible to say. The Seminole discovery has probably opened up more territory previously considered unfavorable than any other discovery in the last five years.

"The territory surrounding the towns of Perry, Stillwater and Guthrie in Noble, Payne and Logan Counties is another area where geologic opinion has been favorably revised because of discoveries within the past two years. This territory is located in a general broad syncline between the Ozark uplift to the east and the southern extension into Oklahoma of the granite ridge of Kansas.

"Because of this rather pronounced synclinal depression the territory included therein has been regarded as unlikely to produce any pools of consequence. However, the encouraging showings of oil and the geologic information obtained from the drilling of a dozen or more deep wells in this territory have given it a prominent position among the areas of highly probable future production.

"Operators are searching for more granite ridge domes southwest of Garber. It is highly probable that more pools will be found in this direction. It is quite possible then that future discoveries may extend the producing territory southwestward across Kingfisher, Logan, Canadian and Oklahoma Counties.

"The general result of recent discoveries has been to show that basin like areas formerly considered too deep for oil possibilities are proving to be not so deep as they were thought to be. In the case of Seminole and Pottawatomie Counties a string of remarkably high anticlinal domes producing large quantities of oil now occupy the approximate position of what was formerly thought to be the axis of a deep synclinal trough between the Ozark and Arbuckle uplifts.

"A few years ago the head of the department of geology at the University of Oklahoma expressed the best opinion of the time when he told his class that the Mississippi Lime was probably 10,000 feet below the surface in Cleveland County around the town of Norman. Now that same territory is being leased in the hope of obtaining Ordivician production at less than half that depth. Such are the changes that are coming about because of recent discoveries.

"Little is known about northwestern Oklahoma. The producing sands of Pennsylvanian, Mississippian and Ordivician ages are generally thought to lie buried so far beneath the Permian redbeds as to offer little hope of future production. However, there is evidence at hand now which indicates that a part of this territory may be underlain by another fold of granite ridge proportions. Township after township of the territory along the axis of this supposed uplift have been leased by the major companies of Oklahoma and Kansas. If this area proves to be as good as many geologists now think possible it will open another territory of major proportions similar in extent to the areas previously mentioned.

"In western Kansas there is evidence of other folds, trending northeast-southwest which may prove to be buried granite ridges. If so these folds may extend down across northwestern Oklahoma with the result that production may be extended much farther west in Oklahoma than now seems probable. The discovery of Ordivician production in Woods County, Oklahoma, would be no more astonishing to the oil industry than was the discovery of the Bartlesville sand in the Cushing Pool in 1913."

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Organize Oil Technical Work, Institute is Asked

TULSA, Dec. 13

THE building up within the oil industry itself of a scientific and technical organization that would concern itself strictly with the many technical problems of the industry was the suggestion drawn from a paper read at last night's session of the Institute by Frank A. Howard, president of the Standard Development Co. of the Standard Oil Co. of New Jersey.

While Mr. Howard made no direct recommendation for the formation of such a society nor did he state what agency should take the work in hand, his remarks reflected the growing feeling among oil company executives that the Institute might well take the lead in building up a scientific and technical division or department. This would serve as a clearing house for the information developed by oil technologists and as a forum for their meetings and discussions.

A committee was appointed by the president of the Institute to consider and recommend to the Institute directors a policy to be followed with regard to consolidating the scientific and technical work of the petroleum industry and its relationship to other technical societies. This committee is composed of E. W. Isom, Sinclair Refining Co., New York, chairman; R. E. Haylett, Union Oil Co. of California, Los Angeles; Ralph E. Halloran, Standard Oil Co. of California, San Francisco; E. De Golyer, Amerada Petroleum Co., New York; R. E. Wilson, Standard Oil Co. of Indiana, Chicago; K. G. Mackenzie, The Texas Co., New York and T. G. Delbridge, Atlantic Refining Co., Philadelphia.

Points Out Mounting Overhead

MR. HOWARD, speaking as the head of a large development department employing a large number of technical men of various professions, stated that the problem of supporting the numerous scientific and technical societies, is very serious. He stated that in the last 10 years, the number of scientific and technical staff men employed in the industry has increased fourfold at least. The reason for this increase Mr. Howard attributed to "closer process control, more buying and selling of oil on technical specifications, better engineered equipment, the adaptation to the uses of the oil industry of processes and equipment borrowed from other industries and more liberal programs of research and development work." All of these, he said, have been required to meet competition and to offset the rising costs of materials and labor.

"The direct result aimed at," he went on to say, "has on the whole been fairly well accomplished, but the gains in reduction of direct costs are in part offset by the overhead expense of maintaining this greatly increased technical staff.

R. S. Petersen, sales engineer, M. W. Kellogg Co., Kansas City, at A. P. I. meeting

Executives' Advice Sought

"THROUGH many different channels the serious nature of this situation has come to the attention of the officers and staff of the American Petroleum Institute and an effort has been made by the president of the Institute during the present sessions to secure the views and advice of a group of technical executives.

"The organization and growth of the various scientific and technical societies has been for the most part a spontaneous effort of the professions themselves to provide for their own members facilities for the dissemination of knowledge and experience and for the making of personal contacts.

"On the part of the industries who employ the members of these professions, the support of the societies both by way of occasional direct financial support and consistent support by releasing their employees for the purpose of attending society meetings and even paying their dues and traveling expenses, amounts to almost universal acceptance of the useful place of the technical society in the scheme of modern business.

The chief technical and scientific societies which are receiving the support of the oil industry, Mr. Howard said, are the American Chemical Society, the American Society of Mechanical Engineers, American Institute of Chemical Engineers, American Institute of Mining and Metallurgical Engineers, American Association for the Advancement of Science and the Society of Automotive Engineers.

That list, the speaker said, is not by any means complete and does not cover the geological profession, which in many respects requires separate treatment.

"Of the societies listed," the speaker went on to say, "almost all have from time to time and in some cases apparently as a matter of regular policy, undertaken to cover in their meetings subjects specifically relating to the technology of petroleum. In some cases it is very difficult to see any connection or direct relation whatever between the profession, science or art which the society represents and the choice of subjects.

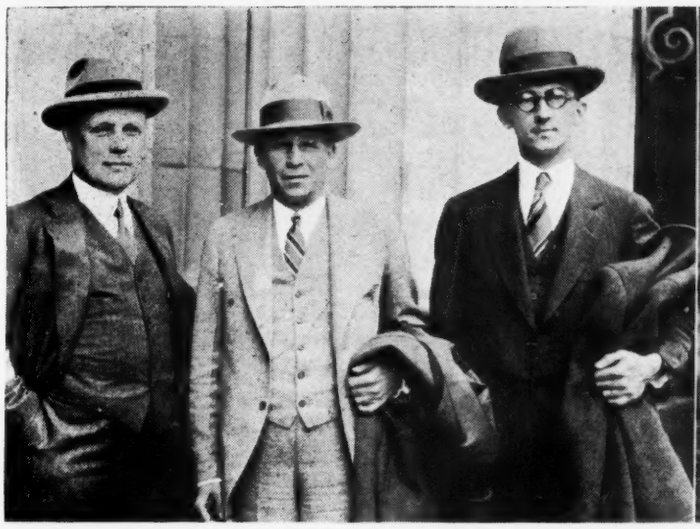
"No one of these societies is adequately covering the field of petroleum technology and the professional work which each should cover within its own natural field suffers perhaps through the broadening of its scope out of that field.

"Great as the advantages of technical society work may be, they mean a great loss of time and a great expense suffered in the hope of obtaining increased efficiency.

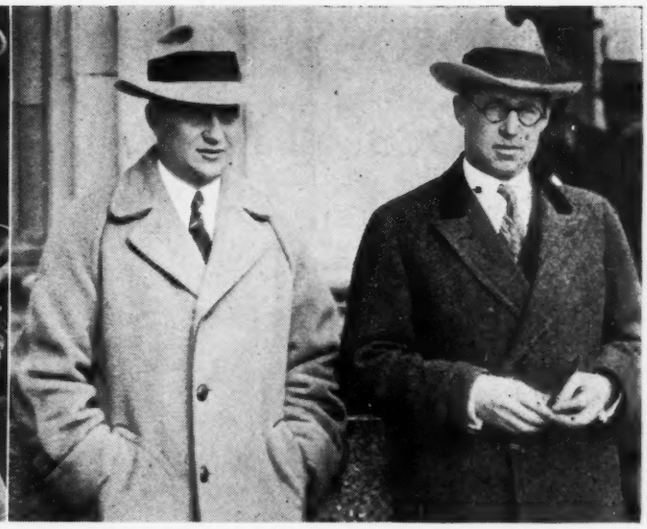
"We must give all of these societies our thanks for the valuable work which they have done in the past in the field of our industry and express to them not as a formality but as a sincere wish, that they shall continue each in its own way and according to its own lights, to endeavor to encourage the interest of its membership in the problems of the petroleum industry and to provide a common meeting ground for members of the respective professions who may or may not be engaged in the petroleum industry and to disseminate knowledge.

"It seems clear to me that our problem is one of building, not tearing down nor attempting now to co-ordinate. From the standpoint of the oil company executive the overhead cost for the maintenance of technical staffs must not be permitted to increase unnecessarily through failure of these staffs to create and utilize the opportunities for increased efficiency which could be theirs within the recognized proper limits of co-operation in a competitive industry.

"This means adequate and well organized technical society work. From the standpoint of the oil technologists themselves, their individual futures depend upon what they accomplish and the cost of accomplishment. I think we all stand committed to the proposition that well organized technical society work is indispensable to secure the maximum results at the minimum cost in the fields of science and technology."



Some of the representatives of the Parkersburg Rig & Reel Co. at the A. P. I. meeting. Left to right: D. B. Crawford, W. T. Hazel, and William Schwemlein, all of Parkersburg, W. Va.



The Philmack Oil Co. at the A. P. I. meeting. R. Otis McClintock on left and Waite Phillips, both of Tulsa

Uniform General Balance Sheet Approved By Institute

TULSA, Dec. 13

ADOPTING the standardized general balance sheet as evolved by its committee on Uniform Methods of Oil Accounting, the division of Taxation and Accounting of the American Petroleum Institute at the Tulsa meeting outlined an ambitious program of work for next year. The committee will prepare and present for discussion and ultimate adoption:

1. Uniform accounts covering capital assets, divided into 10 divisions as indicated in the general balance sheet.
2. Uniform income, earnings and expense statements for each of the operating accounts.
3. Uniform consolidated income, earnings and expense statement.
4. Uniform analysis of surplus.

Only a very few minor changes were made in the general balance sheet recommended by the committee in its report presented by Chairman M. W. Mattison of the Institute staff. The standardized report as adopted is virtually the one given on pages 36 and 37 of the March 10, issue of National Petroleum News. Items in the general balance sheet were defined in subsequent issues of this publication extending through March and April.

The general executive committee of the Institute considered the balance sheet on the closing day of the meeting and adopted it without change from the form in which it was presented by the Division of Taxation and Accounting.

Plans for 1927

DURING the coming year a series of group meetings in various sections of the country will be held by regional sections of the committee on uniform methods of oil accounting. Each group will be assigned one section of the statements which are to be worked out during the year.

Present plans are to call a general meeting of the committee in July. At this session the work of the various sub-committees will be brought together. During the three months following the July meeting the regional sub-committees will work out suggestions resulting from the general meeting and a second meeting of the general committee will be held in October. As a result of this second meeting it is hoped to have the entire program completed at least 30 days before the next annual meeting of the Institute, where the new schedules will be presented for adoption.

Ralph J. Reed, chief engineer, Union Oil Co. of California, Los Angeles, at A. P. I. meeting

The accounting section of the Institute was organized to years ago at the Fort Worth meeting. Since that time its committee has been working diligently to perfect the first big step in uniform accounting methods for the industry. Results of the two years' work are expected to be apparent soon, since it was announced at the present meeting that a number of important oil companies have adopted the institute form for their annual statements for 1926.

The petroleum industry is the first highly competitive section of American business to adopt uniform accounting methods. The railroads and banks have been forced to follow uniform methods by legislation.

Benefits of Uniformity

BENEFITS of the uniform methods are expected to be realized first in matters of taxation and credit. The industry will be able to deal with taxing bodies more satisfactorily by being able to present consolidation balance sheets of a large number of companies to prove disputed points. Bankers undoubtedly will be able to analyze uniform balance sheets for credit purposes with a greater degree of certainty and make their decisions as to proper loans with less delay for investigation.

After completing its consideration of the balance sheet the accounting group listened to nine papers dealing with individual problems and inspected the newest type of tabulating machines designed to facilitate preparation of statements. Individual papers discussed accounting methods for production, refining, marketing, natural gasoline and tank steamer divisions of the industry.

Motor Transport Division to Study Best Truck Operating Practice

TULSA, Dec. 13

RESOLUTIONS requesting the board of directors to establish a motor transport division of the American Petroleum Institute were adopted by the group meeting on transportation problems. Heads of this division of a large number of companies were present.

Because of the press of other business the executive committee of the board of directors failed to rule on the resolutions while in session at Tulsa. The matter will be decided at the next meeting of the committee which is expected to be held within the next 30 days.

Motor transport heads of various companies have been meeting from time to time during the past year to aid in formulating a code of good practise with reference to the construction and operation of tank trucks. These meetings have developed a unanimous opinion among the group that a great deal of valuable work could be accomplished by a division of the institute studying the handling, maintenance and standardized design of all types of trucks used by the industry.

R. E. Gray, of the Gulf Refining Co., who acted as chairman of the meeting, announced that a previous application had been made to the Institute and a mail vote taken of the directorate. As a result the directors asked for more detailed information as to the work the new division would undertake.

Savings Possible

J. F. WINCHESTER, of the Standard Oil Co. of New Jersey, presented the resolution. He said a recent investigation of costs showed that a number of oil companies are spending more money each year on automobile and truck purchases and maintenance than on any other one division of the business. He said a forum for the exchange of ideas on motor transportation problems could be made to save the industry vast sums. The desirability of standardization of tank compartments, static eliminators, vents, length of wheel-base and tire sizes for tank wagons and standardization of shop tools and methods, as well as construction features of all types of automobile chassis, were mentioned in the resolutions, as well as in talks by a number of men at the meeting.

H. E. Newell, engineer for the National Board of Fire Underwriters, read a paper detailing the history of the code of good practise for construction and operation of tank wagons, which will be ready for tentative adoption by next May at the annual meeting of the National Fire Protection Association. At that time the code probably will be made effective, subject to changes at the end of one year.

Table No. 1—Fire Losses and Injuries Resulting From Tank Wagon Operation 1917 to 1925.

FIRE CAUSES	Number of Fires Due to Each Cause	Casualties: Injured	Casualties: Killed	Extent of Loss	Remarks
Static Electricity and Stray currents	10	41	9	$254,466	Loss not stated in 2 cases
Unknown	9	25	11	94,215	Loss not stated in 4 cases
Motor operated during filling	8	1	..	157,500	Loss not stated in 5 cases
Struck by locomotive	6	2	5	27,915	Loss not stated in 2 cases
Drivers and Mechanics matches	4	1	..	.....	Loss not stated
Collision with automobiles	3	..	..	.....	Loss not stated
Improper filling operations	3	..	1	600	Loss not stated in 2 cases
Compartment overflowed	2	..	..	6,000	
Collision with fill pipe	2	..	..	7,000	Loss not stated in 1 case
Manifold or brakes (Vapor ignited by Hot)	2	..	..	4,700	
Vapor ignited by Sparks from bucket	2	..	..	4,000	Loss not stated in 1 case
Leaky Valves	1	..	..	.....	Loss not stated
Vapor ignited by Locomotive	1	..	..	.....	Loss not stated
Vapor ignited by Lantern	1	..	..	.....	Loss not stated
Pump Motor backfired	1	..	..	6,000	Loss not stated
Leaky compartment	1	..	..	400	
Short Circuit Truck wiring	1	..	..	1,800	
Vapor ignited by exhaust	1	..	..	.....	Not stated
Truck driven over embankment	1	..	..	.....	Not stated
Gasoline used for cleaning truck	1	1	..	.....	
Draw off valve left open	1	..	..	13,000	
	62	71	26	$577,596	

A tabulation of fire losses resulting from the operation of tank trucks from 1917 to 1925, a period of nine years, was presented by Mr. Newell. The table reproduced herewith (Table No. 1) shows 62 fires during the period resulting in the deaths of 26 persons, injury of 71 and known loss of $577,596. While the report may not be entirely complete it contains all outstanding fires.

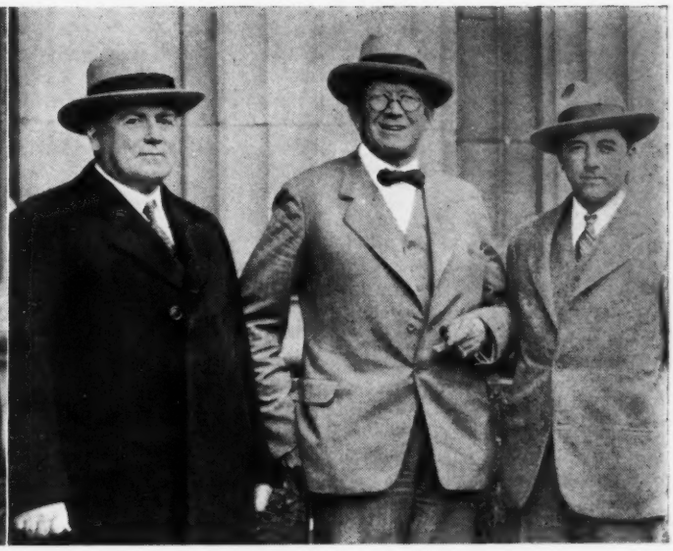
"It will be noted that static electricity and stray currents were the causes of the greatest number of fires," Mr. Newell said. "While having little more than a superficial knowledge of the phenomena of static electricity, the speaker feels that the industry's recommendations leave a great deal to be desired. There is, of course, considerable difference of opinion among so-called authorities on this subject, but it would seem that this industry should initiate such research and necessary experimental work as to determine beyond all question the exact extent of static electricity possibilities and means of abatement that will not be subject to serious criticism.

R. L. Duff, metallurgist, general engineering department, Standard Oil Co. of New Jersey, who took part in discussion at the corrosion symposium, A. P. I. meeting

"Ten of the other causes might very properly be grouped and redesignated 'Carelessness'. They constitute approximately 40 per cent of the total number of causes. From their very nature they imply the need of strict supervision over employes operating tank trucks and incidentally those other employes at points where tank trucks are loaded and discharged. As this table indicates solely the initial cause of trouble, it seems proper to state that in those cases where collision other than with locomotives occurred, the destruction of draw-off valves and subsequent escape of oil was due to the lack of suitable bumpers or other proper safeguards.

"Probably the most important contributing cause of tank truck fires is that relating to vents. A thorough study of many of the fires included in the above record indicates that, while the type of vent usually employed, viz., that known as the ¾ inch vent but actually having only a ⅜ inch vent opening, is sufficient to take care of air displacements due to filling operations, it does not have sufficient venting capacity to safely relieve internal pressures resulting from exposure to fires."

Fraternity brothers at the Tulsa A. P. I. meeting. Left to right: Herbert A. Meyer, assistant to the vice president, Prairie Oil & Gas Co., Independence, Kans., and Frank A. Buttram, geologist and oil producer, Oklahoma City



Left to right: H. G. Davies, Superior Oil Corp., Lexington, Ky.; Thomas C. O Donnell, chairman of the board, California Petroleum Corp., Los Angeles, and John Gourley, Superior Oil Corp., Lexington, Ky., at A. P. I. meeting

Describes Oil-Gas-Powdered Coke Burner For Refineries

By Paul Truesdell
N. P. N. Staff Writer

TULSA, Dec. 11

POSSIBILITY of the adaptation to refinery use of a three-fold burner which can be changed over in a few minutes to burn either gas, fuel oil or powdered coke or coal, was laid before the refinery technologists and operating men at a group session Thursday morning, the topic of which was "Oil for Industrial and Domestic Uses."

The speaker was Ernest H. Peabody, head of the Peabody Engineering Corp., New York. It seemed to many of his hearers that such a burner will bring nearer the time when the refiners can serve the double purpose of getting rid of coke where it is unsaleable and saving valuable fuel oil by burning in powdered form, the coke from their cracking stills in their still and boiler furnaces.

Mr. Peabody was for many years with the Babcock & Wilcox Co. and is author of a book on combustion and steam raising which is recognized throughout the power world as authoritative. Mr. Peabody started out by describing the differences between the steam atomizing and the mechanical atomizing burner and asserted that the latter is much the more economical.

Mostly Steam Burners Used

USE of mechanical atomizing burners is exceedingly limited in the refining industry, the use of steam being almost universal. Mr. Peabody stated that, while it is theoretically possible to operate steam atomizing burners on one per cent of the steam generated by the boiler, it is almost never actually done with less than two per cent of the steam and in the hands of a careless fireman, the percentage often runs up to 10 or even higher.

Mr. Peabody stated that the saving in steam is only one advantage of the use of the mechanical burner. The burner he described is now installed experimentally at the plants of the Atlantic Refining Co. at Philadelphia and the plant of the Associated Oil Co. at Avon, Cal.

The burner includes an air register through which all the air for combustion is sucked in by the burner itself through vanes which are adjustable to admit air as needed. The whole apparatus is a compact circular device that is fitted rather high up in the front wall of the furnace.

The atomizing is done by centrifugal action, the fuel being broken up into a very fine spray and thrown out in the form of a cone. The burner has three inlet ports through which gas, oil or powdered fuel may be fed in. Stripped still gases also can be burned. Mr. Peabody stated that in a central power station where a test was made, a burner was changed from oil to gas in 40 seconds.

Not Suited for Sludge Burning

CONSIDERABLE interest was aroused by Mr. Peabody's talk and he was questioned by Dr. E. R. Lederer of the Texas Pacific Coal & Oil Co. as to the possibility of burning acid sludge or fuel oil with high content of suspended carbon. Discussion developed that the Peabody burner would probably not be suitable for such fuel and those refiners who have special arrangements for operating their furnaces on Dubbs residue or acid sludge mixtures seemed to feel that the cost of the steam used in burning such materials was justified because the troublesome stuff was got rid of and served as a substitute for a fuel that would be more expensive.

The first paper on the program was by L. L. Jacobs of Toronto, president of the American Oil Burner Association. Mr. Jacobs was unable to be present and his paper was read by Leod D. Becker, secretary of the association, who presided at the meeting.

Mr. Jacobs stressed the importance of cooperation between the oil burner manufacturers and the refiners on grades of oil to be furnished for domestic use. There was considerable discussion of the various problems confronting the manufacturers of domestic burning oil and the manufacturers of burners. The subject was brought up of educating the public to disregard the

J. G. Harmon, vice president in charge of production, Marland Oil Co. of Texas, Fort Worth, at A. P. I. meeting at Tulsa

C. C. Brown, president, Kay County Gas Co., and vice president in charge of all production activities of Marland Oil Co. of Delaware, at A. P. I. meeting

Wallace C. Franklin, vice president, Tidal Oil Co., who was chairman of the committee on housing at Tulsa meeting of the A. P. I.

odor and color of the oil furnished them.

Color Brings Kicks

IT was brought out that, although color is of no importance whatever in connection with the burning value of a fuel, many times the householder objects strenuously when an oil furnished him is of a different color than what he has been using. At times it is necessary, one burner manufacturer said, to pump the oil out of the customer's tank after it has been delivered because of the odor or color. It was pointed out that the oil is odorless in burning and that the smell will not be at all troublesome if the oil is stored in tight containers and the burning equipment and furnace are of the proper design and in proper condition.

There was a general feeling, at least among the refiners, that there is too much of a tendency on the part of burner dealers to humor the whims of the customer unduly. It was pointed out that a coal user might as well complain because the coal that had been put into his bin would get his hands dirty and that such a complaint would have about as much weight as some of the kicks registered by users of burning oil in the home.

Sees Dependable Supply

H. W. CAMP, superintendent of refineries of the Empire Refineries Inc., read a paper at this session on "Making Fuels for Industrial and Domestic Burners." Mr. Camp's paper will be published in full in another issue. He devoted most of his attention to the subject of domestic fuel.

He stated the opinion that the present tendency toward high volatility gasoline will be a factor in assuring a dependable supply of the most desirable fuel for household burners. He said that, due to a revision of refining processes made necessary by the demand for a low end point motor fuel, some of the heavy ends that formerly have gone into the gasoline fraction will now be available for use in the burner distillate cut.

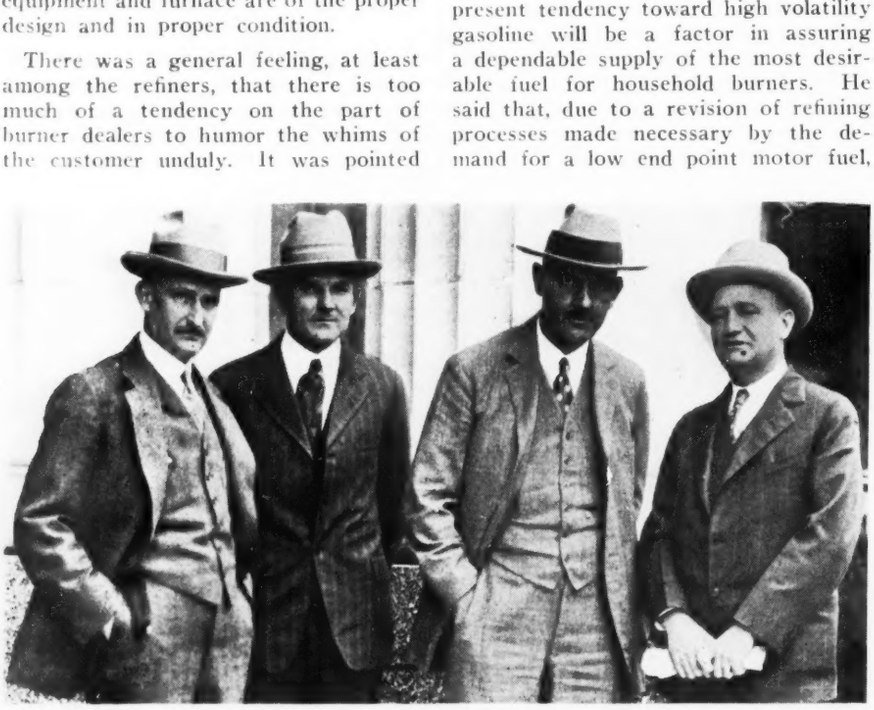
In pointing out the result of the change from a conservation standpoint, Mr. Camp asked:

"What can be a more truly proper use for oil than in promoting warmth and comfort in our homes?"

There was considerable discussion of the part that advancing price may play in the development of the heating of homes by oil. Some speakers considered that price could be practically eliminated as a factor for consideration. It was pointed out that Americans want comfort and are willing to pay for it and, once educated to the advantages of oil as a heating agent for their homes, they will never go back to coal, regardless of the price they have to pay for oil.

The other side of the picture was brought out by those who pointed out that the gas industry, meaning both the natural gas and manufactured gas companies, is hot on the trail of the oil burner manufacturers and that if the cost of burning oil much exceeds the cost of gas, which also is a convenient and desirable fuel, the gas companies are likely to get the business.

It seemed to be the feeling of the meeting, oil men and burner men alike that the prospects both for the increase in the use of oil burners and the adequate supply of oil for them at a reasonable price are very bright.



M. E. Lombardi, assistant manager of production, Standard Oil Co. of California, San Francisco; E. W. Wagy, department of economics, Standard Oil Co. of California; Alexander Deussen, vice president, Marland Oil Co. of Texas, Houston, and Wallace E. Pratt, Humble Oil & Refining Co., Houston, at A. P. I. meeting

Refining Official Buys Oil Properties

PITTSBURGH.—A. V. Hoenig, formerly vice-president of Hope Construction & Refining Co., has bought the producing properties of that company in Kentucky. These properties formerly were owned by the Carter Oil Co. with which Mr. Hoenig was connected when that company was consolidated with the Hope company Jan. 1, 1926.

Institute is Asked to Undertake Task Of Combating Corrosion

By Lawrence E. Smith
N. P. N. Staff Writer

TULSA, Dec. 13

DEFINITE action followed the first general conference on corrosion of equipment used by the oil industry. This conference was a group meeting held under the auspices of the A. P. I. on Thursday and arranged by the Mid-Continent section of the American Society of Mechanical Engineers, of which H. B. Bernard, vice-president, Sinclair Oil & Gas Co., is chairman, and F. Ray McGrew, president of the Standard Pipe Line Co. of Louisiana, vice-chairman.

The action taken was the adoption of a resolution offered by E. P. Bly, Standard Oil Co. of California, and seconded by F. L. Chase, vice-president of the Lone Star Gas Co., requesting the A. P. I. to appoint a general committee on corrosion. The resolution was endorsed by about 300 representatives of producing, refining, transportation companies, manufacturers of equipment and of materials for preventing corrosion.

The reason for concerted action through the A. P. I. on this subject was expressed by Mr. Bly to the effect that all divisions of the oil industry face corrosion problems of major importance, resulting in huge losses of capital, assets and of oil produced, refined and transported.

Mr. Bly suggested in the resolution that the committee to be appointed by the directors of the A. P. I. be composed of three subcommittees representing the three divisions of the industry most concerned with corrosion problems.

As for the transportation division, with which Mr. Bly is most familiar, he suggested that some of the investigations that profitably might be pursued by such general committee might have for their purpose:

1. Stimulation of efforts to produce corrosion resisting metals at costs which would permit of their general use;

2. Development of methods of investigating and testing coating materials for pipe line and of studying soil corrosion;

3. Determination of best practices of applying coatings or other corrosion resisting materials.

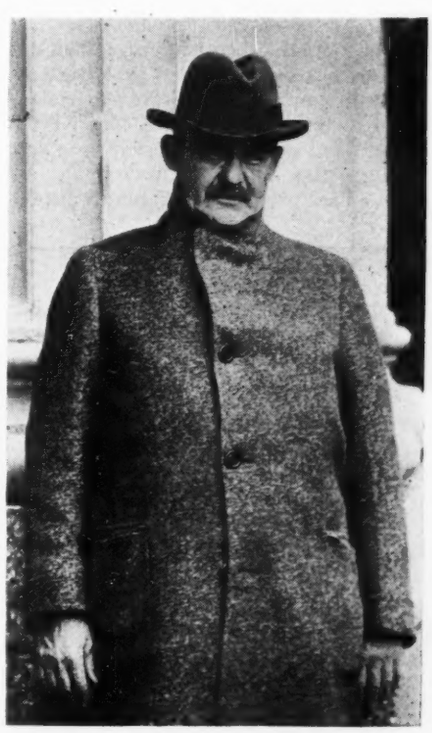
Much Interest Aroused

NO group meeting of the convention could boast of better attendance throughout than this conference on corrosion. The program was an extensive one divided into three groups representing the three divisions of the industry most interested. Extensive discussion followed the reading of each paper.

Dr. Frank N. Speller, director of research of the National Tube Co., who presided at each of the three sessions, expressed his pleasure at seeing a definite step taken toward a real attack of the corrosion problem of the oil industry. Other industries have for several years had committees at work along this line, notably water companies, acid manufacturers and the refrigerating industry. The progress made by these industries has been notable, he said, and it is probable that within a reasonable time definite results will be experienced by the oil industry through concerted action.

Many of the oil companies have carried on experiments to combat corrosion, but the results are seldom known outside the company doing the work. The function of the A. P. I. committee, if appointed, will be to collect and correlate all available information and to promote original studies.

The first of the three meetings was devoted to pipe lines. This division of the industry is subjected, in greater measure than either of the other divisions, to soil corrosion. More factors are involved and less is known about this form of corrosion than any other form, said Dr. Speller. The only extensive work now under way along this line is that by the Bureau of Standards, which has buried hundreds of pipe samples of all types, in various kinds of soil, samples coated with many varieties of materials and samples not coated.



J. C. McCue, assistant manager of producing department, The Texas Co., Houston, at A. P. I. meeting

Some of the speakers held that the problem in the pipe line industry was one to be solved by the metallurgists. Kirk H. Logan, research engineer of the Bureau of Standards, said that the pipe specimens buried by that Bureau have now been in the ground about four years and that to date the corrosion seems to be a function of the soil rather than of the material. Hence, he said, he was a little pessimistic on the idea that the metallurgists can find the answer to soil corrosion prevention.

Huge Losses to Pipe Lines

TO the pipe line division the magnitude of the subject was indicated in the address of C. R. Weidner, chief engineer of the Prairie Pipe Line Co. (published in the Dec. 8 issue of National Petroleum News). Mr. Weidner estimated the annual loss to the pipe line industry at more than one hundred million dollars.

Mr. Weidner's paper, which dealt with protecting and reconditioning pipe lines, was preceded by the paper of E. C. Kincaide, vice president of the Gulf Pipe Line Co., on corrosion of pipe lines. This paper will be presented in a later issue. Mr. Kincaide indicated the need for systematic research when he expressed the opinion that the "question of corrosion of underground pipe lines is practically where it was when Columbus landed in America."

Discussions on these papers followed, by E. A. Clark and E. R. McCarthy, Oklahoma Natural Gas Co.; E. M. Converse, Dearborn Chemical Co.; R. H. Hubbel, Hill-Hubbel Co., whose discussion was presented by another representative of that company.

In the refinery field, the problem is somewhat simpler than that of the pipe line division as metallurgists have already accomplished much in combatting corrosion by developing material more resistant to chemical action. The losses still are large, as expressed by H. F. Perkins, Gulf Refining Co.

"The scrap pile in a large refinery may represent a direct loss of over a quarter of a million dollars a year which, with better knowledge and concentrated effort, may be reduced a third," he said.

Following the reading of Mr. Perkins' paper, discussion was led by R. L. Duff, Standard Development Co.

Refining Problems Met With Panhandle Crude Are Being Solved

By Walter Miller
Vice President, Marland Refining Co.
Delivered Before A. P. I. Session at Tulsa, Dec. 8

DAILY production from the Panhandle field amounts to approximately 175,000 barrels at present. That the area is one of major importance and will be a powerful factor in the oil industry is already demonstrated.

Predictions are freely made that the field will exceed 300,000 barrels per day in the not far distant future, as the limiting factors — transportation problems—are gradually solved.

However, the solution of the Panhandle crude refining problem is of much broader importance than its mere application to the crude oil from this particular field. Geologists tell us that, not only the entire Texas Panhandle, but practically the entire western part of the state south of the Panhandle area as far as Pecos and Crockett counties and including the southeastern corner of New Mexico, in which the Artesia pool development is taking place, was once a great inland salt sea. During the period leading to its ultimate evaporation there were deposited the limestone and dolomite formations, from which production is largely obtained.

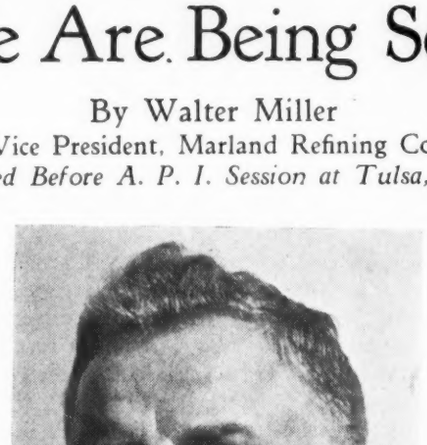
The Westbrook, Big Lake, Upton-Crane and Panhandle areas, are all within, and constitute but a small part of the roughly estimated 55,000,000 acres making up this great area.

Oil produced under such geological conditions, which include the final deposits of rock salt over the lime and dolomite formations, has usually been found to contain higher percentages of sulphur compounds than in petroleum from most other types of geological structures.

To Handle Increasing Amounts

WHAT the production from this vast territory will ultimately amount to no man can say; but it is quite certain that refiners in this country will, within the next few years, be handling a much larger proportion of crude oil from this remarkably prolific area. The developed pools will produce large quantities for many years and new highs will be continually discovered which will augment the present pools.

Most, if not all that crude will have many characteristics in common with those in Panhandle. While none of the other pools within this area have the high wax content of Panhandle, they are nevertheless similar in having at least a fair proportion of paraffine wax, in containing comparatively high amounts of sulphur and in carrying quantities of free hydrogen sulphide in solution.



Walter Miller, vice-president of Marland Refining Co.

The actual processing of millions of barrels has demonstrated that Big Lake crude is much less desirable to refiners than average Mid-Continent crude, both because of corrosion problems and greater difficulty in refining. In fact, the principal difference between Panhandle and the other crudes from this geological area is in the much higher wax content of Panhandle and its apparently greater tendency to hold salt water in suspension, which is probably due to this high wax content.

The accompanying Institute paper is of especial importance because it is the treatment of a problem that many refining plants are just now beginning to face and more will face in the future, by a recognized authority on refining plant operations.

The paper goes into detail in the Marland Company's analysis of this crude, its experience in handling it and treating its products in various phases of refinery operations. It is the most detailed statement yet given out on meeting the particular characteristics of this crude.

A sample tested in the Marland laboratory, which represented a fair average of the crude received at our refinery, showed the following characteristics, which we believe are typical of the field as a whole:

(1) Average Gravity....37.5
(2) Color.....Dark Green
(3) Water bydistill.....1% Approximately
(4) Congealing point...50 to 60° F.
(5) Viscosity.....61 at 100,Saybolt Universal
(6) Asphalts (Byabsorption thru Fullers Earth).....17 to 19% Approximately
(7) Wax (Ether-Alcohol Method).....16 to 17% Approximately
(8) Sulphur Content (Parr Oxygen Bomb).....0.65%
(9) Salt Content.....16 gms. per bbl.
(10) Carbon Residue....2.88% (Conradsen)
(11) Coke by distillation.3.00%

In connection with the foregoing, we conducted some months ago a very interesting experiment to determine the changes made in the gravity, gasoline content and cold tests by subjecting the crude to cracking temperatures and pressures. Straight crude (A) was pumped through a small coil of one-inch high pressure pipe at the rate of about one eighth of a gallon per minute, at which rate the crude took about 15 minutes to go through the coil. Two experiments were run, each at 250 pounds pressure, one (B) at a temperature of about 750°, the other (C) at a temperature of about 850°.

	Normal Crude (A)	Cracked Crude 750° T (B)	Cracked Crude 850° T (C)
Pressure Used		250#	250#
Temperature used		750° F	850° F
Gravity API	35.7	39.7	40.3
Saybolt Viscosity at 100°	54	39	35
Wax Content (by Ether-Alcohol Method)	19.16%	15.13%	9.34%
Gasoline Content	29.8%	34.0%	38.4%
Cold Test	64° F	12°	0° Flowing

A remarkable feature in the changes caused by cracking as above is the fact that the reduction in wax content was almost exactly equivalent to the increase in gasoline.

The water content is, of course, a variable, depending partly upon the particular well or wells from which the crude is obtained, and largely upon the degree of settling to which the crude has been subjected. Excessive water will settle out fairly quickly in tanks, down to ¼ of 1 per cent, when the

crude is at average summer temperature.

The sulphur content of this particular sample is about the average of the crude being received by us, although some parts of the field seem to run slightly higher, in some cases as high as 1 per cent to 1.1 per cent. The concentration of salt in the crude does not seem to be entirely dependent upon the amount of water shown by distillation. We have had instances of several crude oils yielding by distillation .2 of 1 per cent of water, but apparently varying in salt content from 5 to 40 grams per barrel. Whether this indicates a suspension of saturated salt solution difficult to remove because of the presence of wax, or whether there is an actual suspension of salt crystals in the crude, is something we have not as yet determined.

We will not attempt to go into exact differences in yields. The gravity of Panhandle crude runs quite uniform, the bulk of it weighing between 36 and 38 A.P.I. The U. S. motor gasoline yield varies roughly from 28 to 32 per cent, 30 per cent being a fair average. The 41-43° A.P.I. kerosene fraction will range from 6 to 8 per cent, these results differing slightly in different refineries. A laboratory distillation of a 37.5° crude sample in a comparatively efficient apparatus, with steam introduced after the gasoline fraction had been taken off, to prevent cracking, gave the following results, which we believe to be a good average of the field, varying with lighter or heavier crude:

Gasoline	30.7%
Gravity	58.4
I. B. P.	136
E. P.	435
Kerosene	7.7%
Gravity	41.3
Flash	186
Fire	206
Gas Oil	22.4%
Gravity	35.0
Flash	200
Fire	225
Wax Dist.	13.9%
Gravity	30.0
Flash	220
Fire	300
Vis. @ 100	106
C. T.	91
Bottoms	34.5%
Gravity	21.0
Flash	530
Fire	610
Vis. @ 210	290
C. T.	59
Color	Black
Loss	.8%

The foregoing laboratory yields are based upon running to a comparatively heavy fuel oil bottom but taking wax distillate overhead.

Marland refinery operating conditions a e such that we have made no attempt to utilize any fraction of the Panhandle crude we process for lubricating oil or wax recovery. About half of the 28,000 to 30,000 barrels charged daily to the crude stills consists of Oklahoma crudes and supplies the basic material for our paraffine wax, neutral oil and filtered cylinder stock operations, the overhead gas oil being used as cracking stock for Fleming process cracking stills.

The other half of the crude—our charge of Panhandle—is put through two large pipe stills, one equipped with a set of one flashing and two medium height bubble towers, the other with one single large bubble tower about 11 feet in diameter and 78 feet in height. Both of these stills are equipped with what to the uninitiated is a bewildering array of tubular heaters and exchangers. In these units the Panhandle crude is stripped of its gasoline, kerosene and light gas oil fractions, the gas oil being used as a charging stock for the Cross stills, while the residue is charged to Dubbs cracking stills. The yields are approximately as follows:

Gasoline	30.4%	**Gas Oil**	11.1%
Gravity	59° API	Gravity	37.5 API
I. B. P.	114° F.	Flash	250° F.
90%	390° F.	I. B. P.	480° F.
E. P.	435° F.	Sulphur	4%
Color	30	**Residuum**	50%
Sulphur	1%	Gravity	27.0 API
Kerosene	7%	Flash	320° F.
Gravity	41.5 API	I. B. P.	536° F.
Flash	170° F.	Vis. Furol	29 @ 122
I. B. P.	380° F.	Vis. Saybolt	68 @ 210
Color	15	Sulphur	68%
Sulphur	28%	Loss	1.5%

While we show yields as U. S. motor gasoline, the usual variations in cuts to higher or lower end points to suit market requirements are available to the refiner. Also the percentage of light gas oil taken off can be varied as requirements dictate the making of a greater or lesser quantity of charging material for the various types of cracking units.

With the exception of the difficulties brought in by the corrosion problems and salt content of the crude, our operation to this point is quite orthodox. The extra wax content and high congealing points are not particularly troublesome in the refinery, whatever difficulty they may cause in field handling and transportation.

Engler Distillation on Gasoline from Small Tower.

Gravity	58.4
I.B.P.	136
10%	188
20%	208
30%	228
40%	246
50%	268
60%	290
70%	316
75%	330
80%	344
85%	360
90%	384
95%	419
E.P.	435

Some of the eastern refiners are running Panhandle to coke instead of to a liquid residue end product in the primary distillation. The Prudential refinery at Baltimore, for illustration, is processing considerable quantities in the following manner: From 32 to 36 per cent of the crude oil is first taken off overhead in the form of crude naphtha. The bottoms are then recharged directly to typical side-fired cylindrical coking stills equipped with conventional fractionating towers. The products cut from this operation consist of a small amount of cracked crude naphtha distillate, a rerun distillate which contains the kerosene fraction, a light and heavy gas oil, a paraffine distillate, a heavy overhead fuel oil and the usual wax tailings or wax slop cut made during the process of coking the still.

The rerun distillate obtained overhead from the coking still is rerun for kerosene, a small amount of cracked naphtha made while running to coke taken off overhead, and the bottoms are thrown into gas oil. In this particular refinery all the naphtha cuts are thrown together, given the necessary acid treatment and redistilled in steam stills for the desired gasoline cuts. The coke produced in the coking operation of the topped crude runs from 11 to 12 pounds per barrel charged to the coking still. The gas oil cuts and the overhead fuel oil, the latter ranging from 28 to 30° gravity, are used as charging stock for cracking stills.

Corrosion Problems

THE corroding substances encountered in refining Panhandle crude are hydrogen sulphide (H_2S) and hydrogen chloride (HCl). Hydrogen sulphide is encountered partly as free gas in solution and partly as formed by the breaking up of the sulphur compounds due to the heat of distillation. Hydrogen chloride is probably formed by the breaking down of magnesium chloride present in small percentages in the salt solution, the reaction being brought about in the presence of water particles by the influence of the heat of distillation. This hydrogen chloride on reaching the condensing point and combining with any water present forms a weak hydrochloric acid, very destructive in its action.

Our experience indicates that little if any of the magnesium salt which may enter the tube stills with the sodium chloride survives the primary distillation, and the corrosion problems of the subsequent cracking and rerunning operations are limited to those of the sulphur compounds.

One of the steps in combating corrosion in our primary distillation units is the elimination of salt so far as practicable, to reduce as much as feasible the possible production of hydrogen chloride, as well as to eliminate the deposition of normal salt in the apparatus. What we are doing and attempting to do in salt elimination is touched upon in another paragraph. In both our three-tower and one-tower distillation units we introduce ammonia into the systems at the rate of about ten pounds per 1000 barrels of crude charged, about half being put into the crude stream.

Hydrogen Chloride Counteracted

The quantities are measured by setling the ammonia drum on a platform scale, connecting it to the inlet

line of the crude oil pump and controlling the rate of flow through a needle valve. The balance of the ammonia is introduced into the base of the final tower. We have ample evidence, in the form of tests of the gases evolved and in deposition of ammonium chloride in various parts of the system, that this amount of ammonia is sufficient to counteract the effect of such hydrogen chloride as may form from the magnesium salt in crude carrying as much as 50 grams of total salt per barrel.

It would be a very expensive proceeding to neutralize with proper chemicals all the hydrogen sulphide liberated during the primary distillation. Fortunately in the vapor phase hydrogen sulphide gas is not a very active corroding agent at low temperatures. Its activity becomes dangerous at temperatures ranging upward from 500° F. Therefore, the two danger points in hydrogen sulphide corrosion are at the high temperatures and in the condensing system.

There are two practical methods for counteracting the corrosive action in the condensing zone. Ammonia is an impractical neutralizer here because of the expense involved, even though complete neutralization seems unnecessary as shown by experience. Incidentally, the use of excess ammonia has a considerable deleterious effect on the admiralty metal tubes used in most of the modern tubular exchangers and condensers.

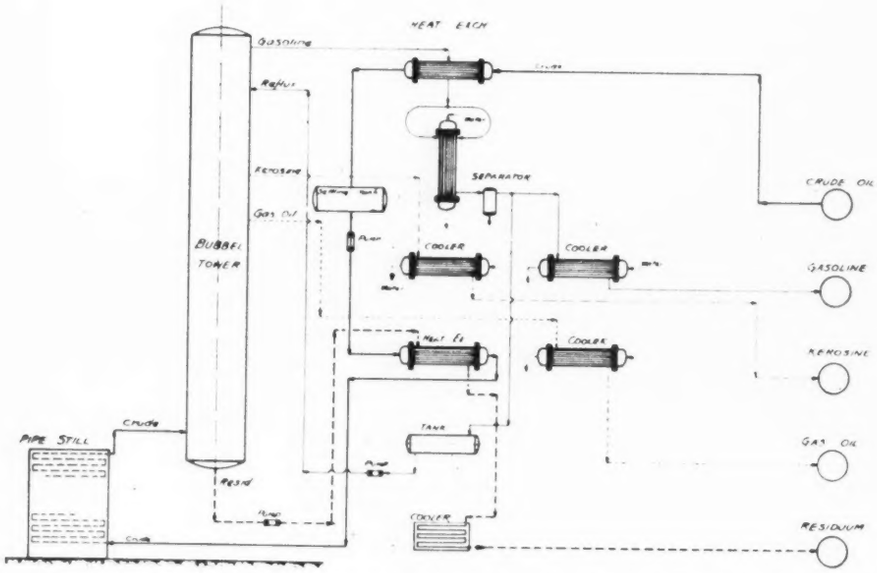
Two Methods for Condensing System

THE first of the two methods for the condensing system is that of adding to the condensing vapors a weak solution of soda ash. Our practice calls for about 25 barrels an hour of a 1 to 3 per cent solution. This must be introduced at a point where the temperature of the vapor stream is not high enough to vaporize the water. The effect is to neutralize in part the hydrogen sulphide and at the same time provide a diluting agent which so reduces the concentration as to slow up the corrosive action to tolerable limits. The second method is simply to introduce a large quantity of water into the vapor stream at some suitable point in its path, (and by a large quantity of water is meant from 1½ to 2 gallons of water for each gallon of condensed distillate). In this way the hydrogen sulphide is literally drowned by diluting it to nearly zero concentration, thus slowing up the corrosive action to a low limit without the expense of a chemical.

It must not be inferred that after we had done the above things we had no corrosion. On the contrary, we still have very perceptible and expensive corrosion taking place. If, however, we did not provide against it, our equipment would last but a short time indeed. It is quite possible that we have greater difficulties in our primary distillation units than would have been our lot had these plants been designed originally for Panhandle crude operation.

On our Cross cracking stills, in which we crack the Panhandle light gas oil, we have used no chemicals, as we expected little excessive corrosion. The sulphur content of the light gas oil fraction does not run above .4 of 1 per cent, and the only difficulty observed at the start was in the reboiler tubes. We thought this might have been an effect more of erosion. However, we are planning the use of a small amount of chemical because of an action, comparatively slow but none the less definite and positive in the tubes. We have observed no action in the balance of the apparatus.

ONE TOWER PIPE STILL SYSTEM



One-tower pipe still system for handling Panhandle crude at Marland plant. The tower is bubble type, 11 feet in diameter and 78 feet in height

In our Dubbs units the problem is again a real one. The residue charged to the plant has usually a little more sulphur than the original crude, and preventive measures are essential. Our practice is to introduce a mixture of caustic and ammonia into the charging line of each unit. This consists of a mixture of 13 Be. caustic and 26 Be. aqua ammonia in the proportion of one gallon of aqua ammonia to 100 gallons of 13 Be. caustic solution. It is pumped into the system by special Hills-McKenna pumps at the rate of 16 gallons per hour per unit. This is at the rate of .178 pound of caustic per barrel of charging stock.

The tube plugs show a fairly high rate of corrosion. Some corrosion is noted on the dephlegmator wall opposite the inlet pipe. There is also corrosion in the usual corrosion area in the reaction chambers, this area being all of the head and the side walls down for about three feet. Neither of these last two items are serious, and we have not as yet lined these places, although we are prepared to do so in the near future. We have more corrosion in our tubes than we anticipated, although Dubbs field inspectors tell us that, judging by the amount of throughput rather than hours of running, we get a normal service.

As an industry, we have not approached the limits of possible prevention and control of corrosion by chemical means, and it might be said we have hardly started taking advantage of recent metallurgic progress in this direction.

Salt Problems

AS STATED before, salt water in the crude will settle out quite rapidly at normal summer temperatures down to .2 of 1 per cent from the bulk of the oil in the tank, the last four or five feet being of a higher concentration. It is a characteristic of the crude that the ordinary centrifuging test seldom throws out all the water present and the distillation method has to be relied on for accurate determinations.

In the attempt to reduce this salt water content we have followed to some extent the experience and practice of the Amarillo Refining Co. plant in Amarillo, Texas, probably the first refinery to run this crude exclusively. The crude stream going through the various heat exchangers is diverted, when a temperature of from 200 to 250° Fahr. has been reached, to a settling tank. This is a horizontal shell 10 feet in diameter by 30 feet in length, with provision for leading any evolved vapors into the tower system of its particular unit, and for drawing off such salt water as settled out from the bottom, the balance of the entering liquid being picked up by another pump.

While we have been able to take out a part of the salt water still remaining in the crude, and thereby reduce the rate of salt deposition on the heating surfaces correspondingly, this method

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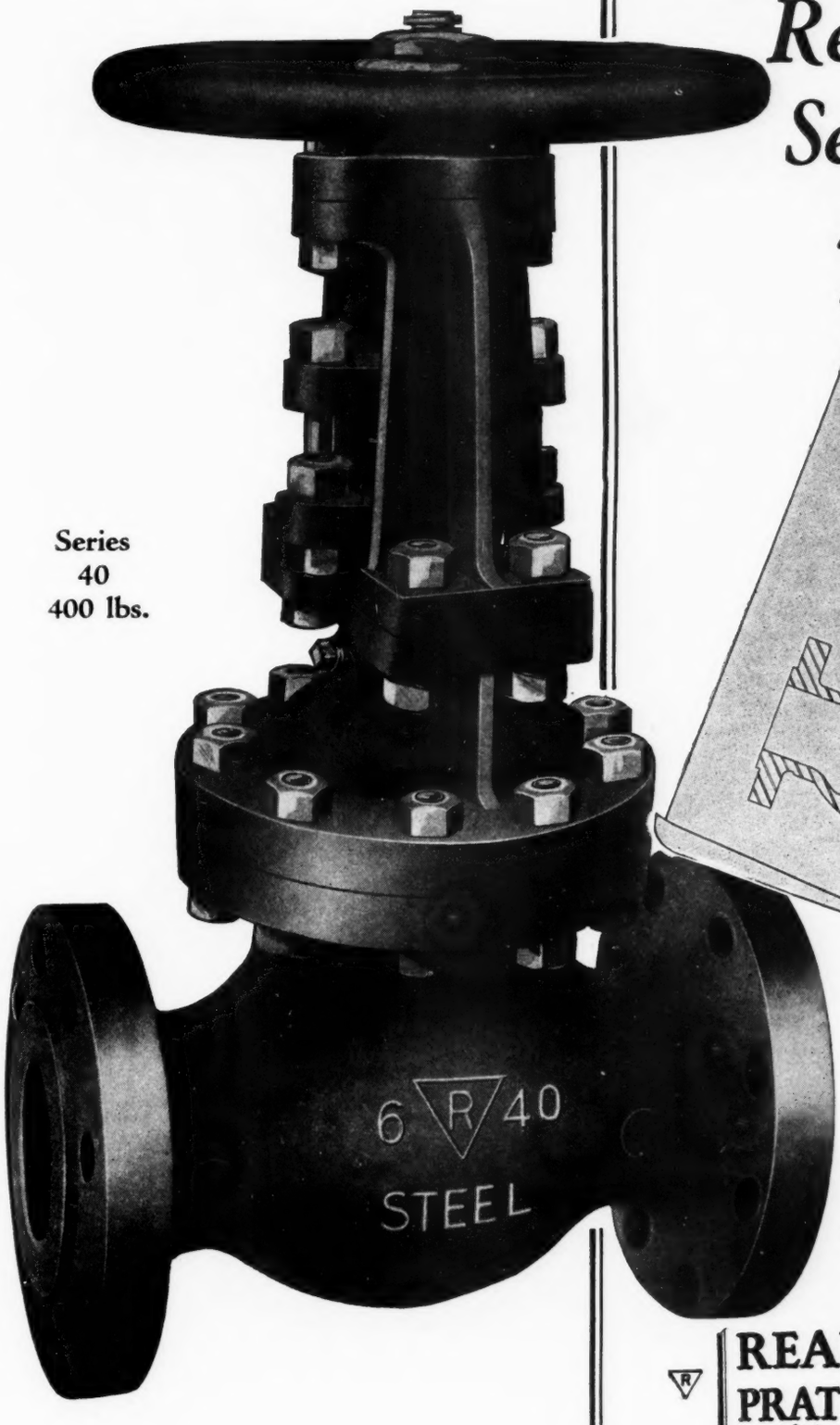

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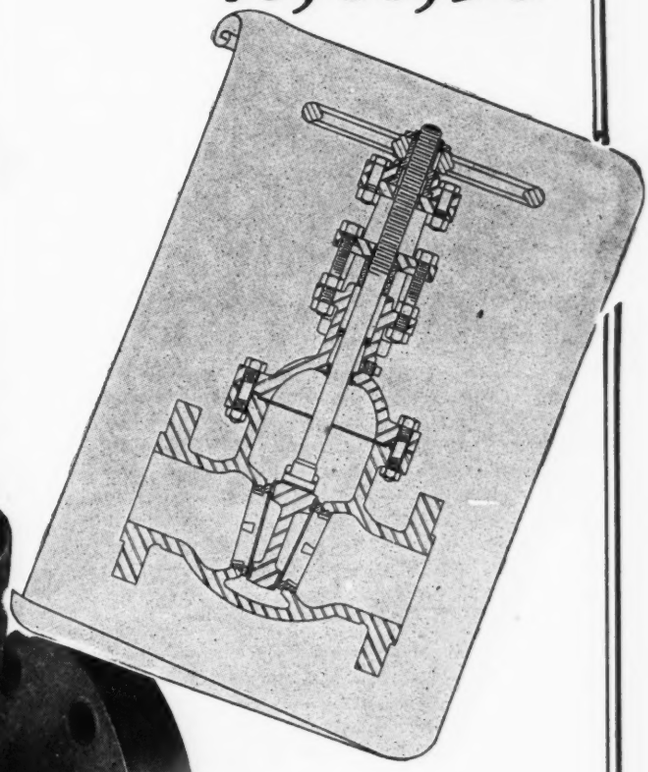

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has been only partially satisfactory. It is considered advisable to permit the settling of salt water to take place before the temperature has reached a point where generation of steam may occur under the pressure involved. Also there is a possibility that hydrogen chloride may be liberated from the magnesium salts present at temperatures as low as 220° F. and with increased rapidity with higher temperatures.

Incidentally, the flashing off of water would tend to the formation of salt crystals directly suspended in the crude, and therefore difficult to settle out. As stated, this settling method is only partially successful. Whether larger settling units would give materially better results is debatable, although we were unable to notice any material improvement in conditions when using two drums in parallel for settling purposes, thereby providing twice the settling time.

Washing Equipment Installed

WE BELIEVE that a better method than this will ultimately be found. In one refinery a washing equipment is being installed, consisting of two tanks, in one of which crude is distributed through a perforated spider coil located about three or four feet above the bottom of the tank, the crude flowing upwardly through the water bath to an outlet 20 or 25 feet above the inlet, warm water being introduced a few feet below the oil outlet, also through a perforated spider coil, flowing down through the crude and drawn off the bottom. The second tank is used for final settling.

Small size experiments have indicated that at temperatures as low as 135° F. no emulsion is formed under such conditions. Unfortunately this installation is not yet ready for operation and there is a question whether the contact between water and oil will be intimate enough to accomplish the desired aim. We are carrying on experiments on a somewhat larger than laboratory scale along similar lines. If such a scheme can be successfully worked out, many advantages will accrue.

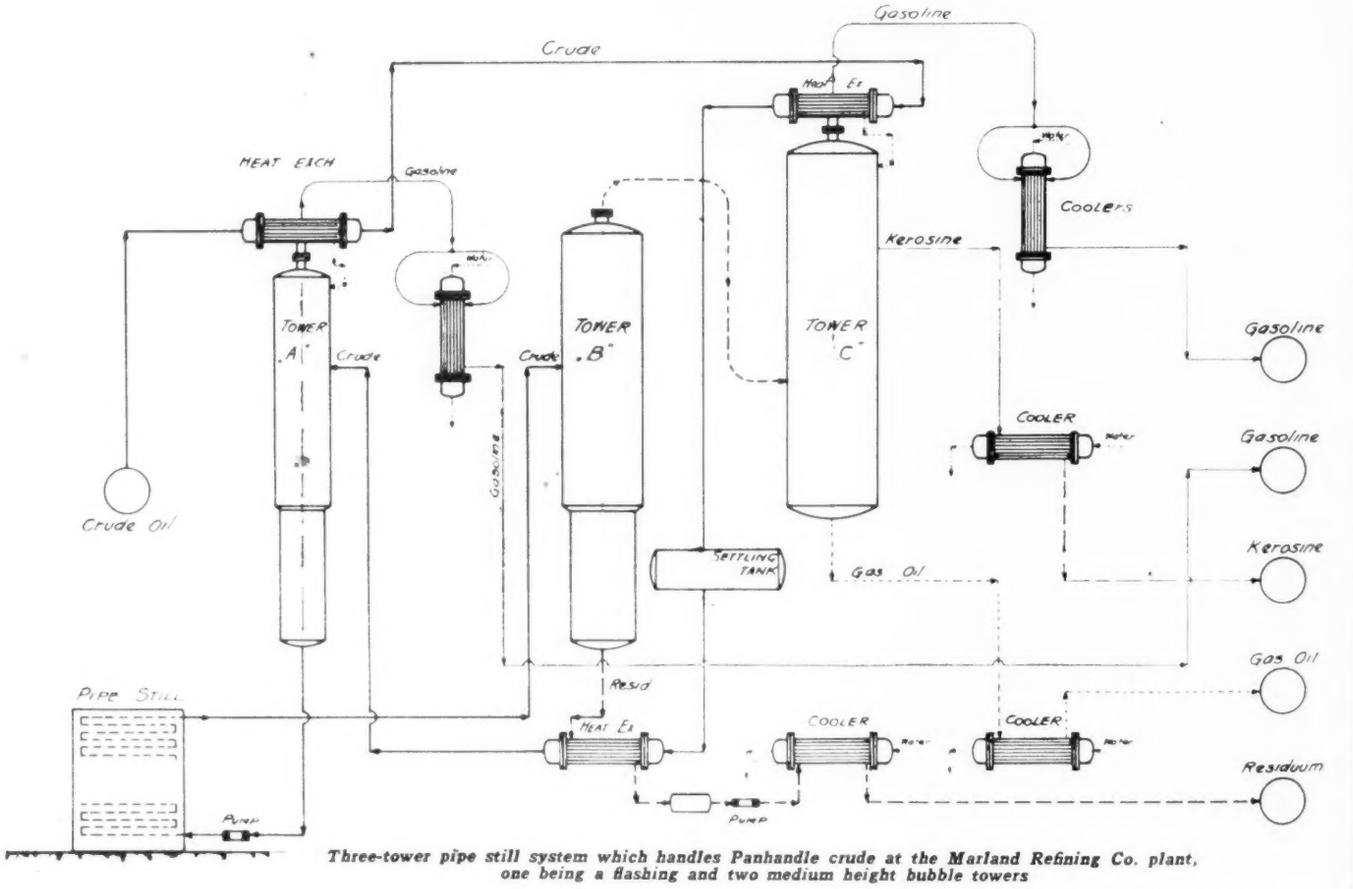
Even though all the water may not settle out in practice, the great bulk of the salt content should be eliminated, and the remaining solution be of very low concentration. Such a method should also take out the greater part of the hydrogen sulphide in solution in the crude and reduce that phase of the corrosion problem.

Larger Settling Capacity

IF NO better scheme can be devised than the settling method now employed by us, our plan is to equip one of our units with a much larger settling capacity and, by reduction of the velocity of the heated crude and the further study of the temperature conditions most favorable, to bring about a more complete and satisfactory elimination of salt. While the salt deposits are easily cleaned out by means of hot water or steam, they nevertheless involve fairly frequent shutdowns of equipment and consequent loss of capacity, as well as hot tube trouble and a decrease of heat conductivity. This difficulty is not confined to the pipe still proper, as salt deposition takes place all along the line in the crude heating exchangers.

The beneficial effect of any system which substantially eliminates all the salt is not limited to the primary distillation units, but will be advantageous, at least in our case, in cracking operations. Salt crystals held in suspension in the reduced crude from the primary still, amounting to from 15 to 35 grams per barrel of residuum, become a plague in the tubes of the Dubbs stills, depositing with coke on the interior of the tube walls; lessening heat transmission, causing overheated and burned out tubes, shortening runs as well as the life of the tubes; increasing measurably the difficulty of cleaning the tubes between runs, and generally constituting a curse on the poor refiner. However, we have had little or no indication of any magnesium chlorides carrying through to our Dubbs units in the residual of the crude.

· THREE TOWER PIPE STILL SYSTEM ·



Three-tower pipe still system which handles Panhandle crude at the Marland Refining Co. plant, one being a flashing and two medium height bubble towers

The operation of our two 2000 barrel capacity Cross cracking units on the light gas oil fraction from Panhandle crude does not differ materially from the cracking of Mid-Continent gas oils. The stills are run to make end point gasoline, which is treated in the vapor phase Gray process towers. While the sweetening of the gasoline is slightly more difficult, the effect of sweetening on color stability is about the same.

Our Dubbs cracking stills are the 90 tube type equipped with two 10x40 foot reaction chambers, with a charging capacity when operating on Panhandle residuum of about 1800 barrels per operating day, running to coke. These are larger Dubbs units than any in operation now, with the exception of one in the Richmond refinery of the Standard Oil of California.

Results of Cracking Satisfactory

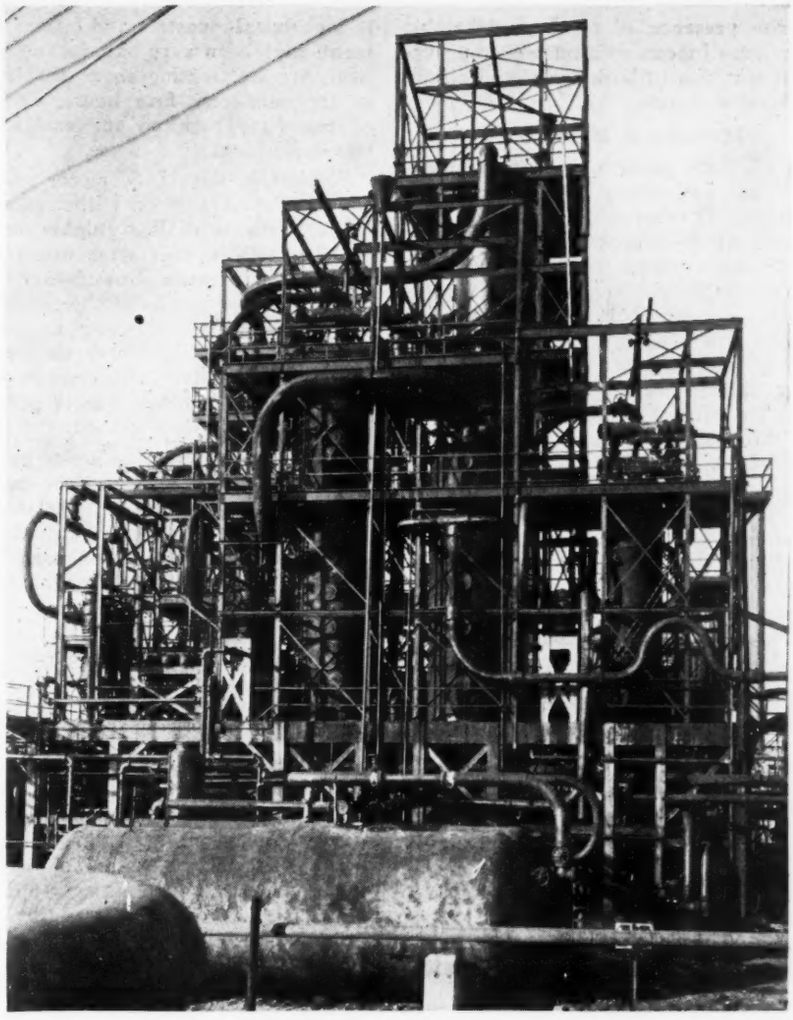
THE results of cracking the 26 to 27° A.P.I. gravity residuum from our pipe stills have been very satisfactory, difficulties due to corrosion and salt excepted. We are obtaining average yields of about 77 per cent of 54 to 55° A.P.I. pressure distillate of from 490 to 510 end point, yielding in turn 65 per cent to 70 per cent of gasoline of U. S. motor distillation range, the pressure distillate bottoms on rerunning ranging from 34 to 36° gravity.

This distillate presents no unusual problems in treating and finishing as compared with Dubbs distillate produced from other average Mid-Continent crude residues, with the single exception, as was also evident in the product of the Cross stills, of a slightly increased difficulty in sweetening.

While we are finishing and decolorizing it by rerunning in fire stills without steam and passing the vapors through Gray process vapor filtration towers, from which we are getting very satisfactory results, our laboratory experiments indicate that those using the more orthodox method, i.e. fairly heavy acid treating followed by neutralizing and sweetening and redistillation in steam stills at low temperatures will be able to get results comparable with their practice on products from other sources.

Coke Yield is High

THE coke yield from the Dubbs units is high, varying from 50 to 55 pounds per barrel charged, and the wet gas put through the casinghead plant carries considerable hydrogen sulphide, thus increasing the problems of casinghead gasoline recovery and quality. The cracked gasoline obtained from the distillate runs apparently about one degree lighter in gravity than cracked gasoline made under the same conditions from average crude residuum. So far as we have been able to determine, no additional difficulties are to be encountered in finishing the gasoline from this residuum than are met with in the products of average Mid-Continent crudes. The high coke yield, even with the large reaction chambers, holds our actual running time down to between three and one-half and four days.



This bewildering array of tubular heaters exchangers and towers is the three-tower pipe still system through which Panhandle crude is put at the Marland refinery

We have made a few runs on one of our stills to liquid residuum, cracking to the point of making from 35 to 40 per cent of gasoline. Our expectation was that a 20 to 24° gravity residuum would show a very low cold test but to our surprise the congealing point still remains comparatively high, ranging between 45 and 60 degrees, Fahr. We are now carrying on further work in this unit, with the object of determining the operating conditions necessary to produce a residuum with a more suitable cold test and satisfactory carbon content for marketing purposes.

Finishing of Straight Run Light Products

THE straight-run gasoline offers no unusual decolorizing problem, being similar in this respect to other Mid-Continent crudes. It must be given a caustic wash, or equivalent treatment, to remove traces of hydrogen sulphide gas carried in solution. It is in the sweetening of gasoline that differences are encountered.

U. S. motor gasoline sweetened in the ordinary way requires several times as much plumbite solution as for instance a similar gasoline from Tonkawa crude, and the quantity of sulphur necessary to complete the reaction is tremendously higher, ranging from 15 to 20 times the quantity. The time required to carry out the operation is several times longer than normal, necessitating in consequence the use of considerably more equipment for the same throughput.

Here again a substantial contribution has been made by developments worked out in the plant of the Amarillo Refining Co., who for a considerable time have been following the practice of circulating from and to the supply tank a mixture of gasoline and doctor solution through horizontal mixers with rotating propellers to enforce agitation until the reaction between the plumbite and mercaptans is completed. This method, however, did not work very satisfactorily until they developed the principle of introducing continuously small quantities of air into their mixer.

This so improved the results that the time element was cut to less than half and the chemicals required to bring about the reaction were greatly reduced. Whether the addition of the air acted chemically upon the plumbite by way of a reoxidation process, or whether the effect is due to a more violent agitation or more intimate contact made possible

by the presence of air is a debatable question. In our opinion the improvement was due to both the chemical and mechanical action.

Mechanical Mixer Used

WE ARE using a mechanical mixer for sweetening, built upon this principle. It consists of three eight foot lengths of 24-inch standard pipe, with heads and stuffing boxes on the ends, the whole resting in a horizontal position in a steel cradle. Each cylinder is equipped with a shaft to which are attached four four-bladed propellers, somewhat similar to the ordinary electric fan. The propellers are so mounted that the throw of the second is opposed to the first, and the throw of the fourth to the third, to give the maximum agitation and contact. The shafts between each unit are connected with flexible couplings to permit of one common power application. In addition the three cylinders are connected to each other on the side with eight-inch pipe to permit continuous flow through the apparatus. The mixer is run at a speed of 100 to 150 rpm.

The gasoline to be treated is pumped into unit No. 1 in which the compressed air is introduced. The mixture of gasoline, chemicals and air is run from the end of the third unit to the supply tank, in which the air escapes while the chemicals and gasoline are continuously recirculated with new air being added until the reaction between the plumbite and morcaptans to form lead morcaptides is completed.

Sufficient sulphur is then introduced, still continuing the circulation, to bring about the completion of the reaction to disulphide and lead sulphide or "Blackstrap." The gasoline is then given a thorough water wash. The savings in chemical costs and time element have been very satisfactory. Normally we are treating about 2500 barrels in approximately four hours, exclusive of the time required for caustic and water washing.

Sulphur in the U. S. motor gasoline runs about .1 per cent the allowable limit. Because of low sulphur on our other gasolines, this does not trouble us, but experiments showed that treatment with one pound 66° Be. sulphuric acid after caustic washing to remove hydrogen sulphide, reduces the sulphur content materially. The cracked gasolines are safely below the .1 per cent specification.

Another interesting feature of gasoline finishing is the comparative case of sweetening the more volatile straight run fractions. Cuts of about 410° or lower end point, while still more difficult to sweeten than a similar product from northern Oklahoma crudes, use but a fraction of the chemicals and time required in sweetening the U. S. motor gasoline obtained from the skimming of the same tank of Panhandle crude.

The finishing of the straight-run kerosene fraction presents both a decolorizing and sweetening problem. Many experiments were conducted on both laboratory and plant scale, in which the merits of acid treatment followed by fine fullers earth contacting, split acid treatments in various strengths, acid treating plus filtering through fullers earth, and sweetening, as well as other schemes were tried out in an attempt to cut down the cost of finishing. Along none of these lines have we been able to reach a satisfactory result which would supersede economically that of using what to us seemed excessive quantities of acid. We have found it necessary to use from 6 to 10 pounds of 66° acid per barrel of kerosene treated, depending upon the starting color of the batch. Undoubtedly ways and means will be developed in the future to improve this condition.

Lubricating Oils and Waxes

OUR laboratory indications are that Panhandle crude is entirely unsuitable for the making of cylinder stocks of any kind. Our own practice as described is to crack all of the heavier products, but the Prudential refinery previously referred to obtains a good yield of high melting point wax from Panhandle paraffine distillate. The high wax content, however, is somewhat of an embarrassment in two ways: It is sometimes necessary to partially recrack the paraffine distillate, and, if a normal cold test neutral oil is to be made, the pressing throughput is very materially reduced, even though the wax output may remain satisfactory.

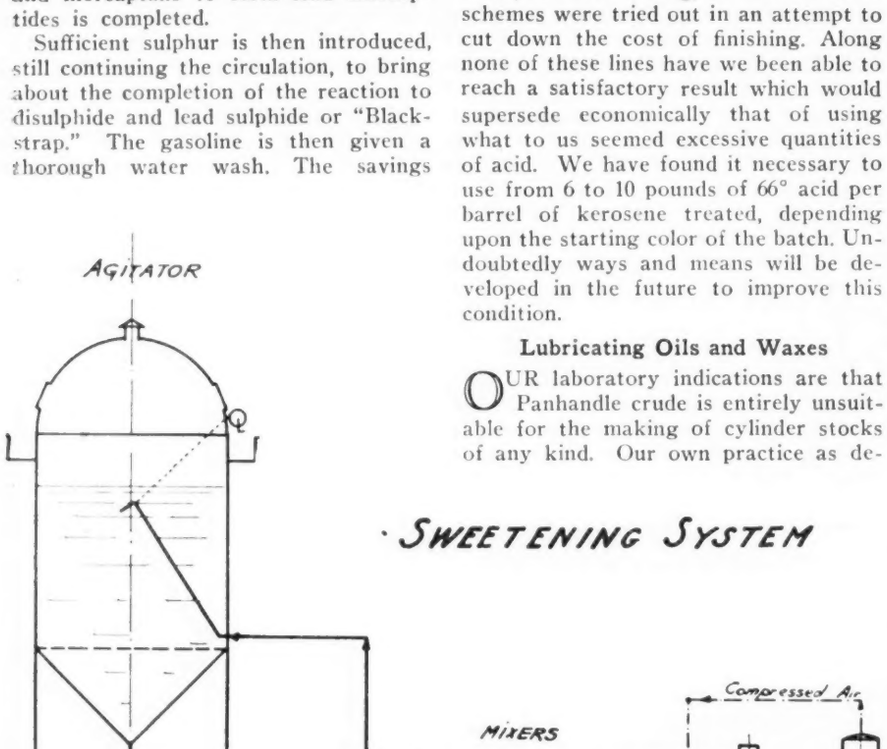
The ideal condition for this work is apparently reached, if it is permissible to make a lubricating oil of from 35 to 40° cold test, which means a pressed distillate of about 30° F. cold test. Our opinion is that the trend will be to utilize Panhandle as a source of cracking material and depend on the other crudes for raw material for lubricating oils and wax production.

Comparative Value of Panhandle Crude

WE HAVE been asked many times our opinion as to the comparative value of Panhandle with crudes of similar gravities of average Mid-Continent type. We won't know actually for a long time. There are too many undeterminable factors to warrant any attempt to more than roughly estimate the difference in value to refiners. True, we can say how much our corrosion-combating chemicals are costing, but we don't know yet whether we are using the right amount.

We can calculate the extra cost of treating the refined products but there is no way of determining as yet the cost, or measuring the rate of depreciation of our equipment. We have made several attempts to estimate this figure, taking into consideration the following factors: That of lower gasoline content than average crude of the same gravity; unavailability as a lubricating oil source; extra cost of combating corrosion and of treating products, our best guess as to the rate and cost of depreciation on equipment and the cost expressed in money, of loss of capacity due to extra shut-downs. Our figures have ranged from 23 to 28 cents per barrel less value to the refiner delivered at his plant. We believe that 25 cents is as fair a figure as can be arrived at today.

In conclusion let me say that we do not consider the problem of refining Panhandle crude to be by any means solved as yet. What contributions, if any, we have made to the art have been more in the way of the bringing together and the adaptation and utilization of existing knowledge, and we are indebted to many of our friends in the industry for assistance and information given us. We look for wonderful progress in the near future in the way of better handling of corrosion problems and for still greater reductions in the cost of finishing products.



Mechanical mixer for continuous sweetening system for treating pressure gasoline from Panhandle crude at Marland refinery

Conclusions Drawn from Two Lightning Fires

By Ralph J. Reed
Chief Engineer, Union Oil Co. of California
Read Before Group Session on Fire Prevention, A. P. I. Annual Meeting, Tulsa, Dec. 9

APRIL, 1926, was marked by two great fires at Union Oil Co. tank farms at San Luis Obispo and at Stewart, near Brea, Orange county, Cal., resulting in the destruction of some 7,800,000 barrels of oil reserves above ground. The two locations are about 230 miles apart.

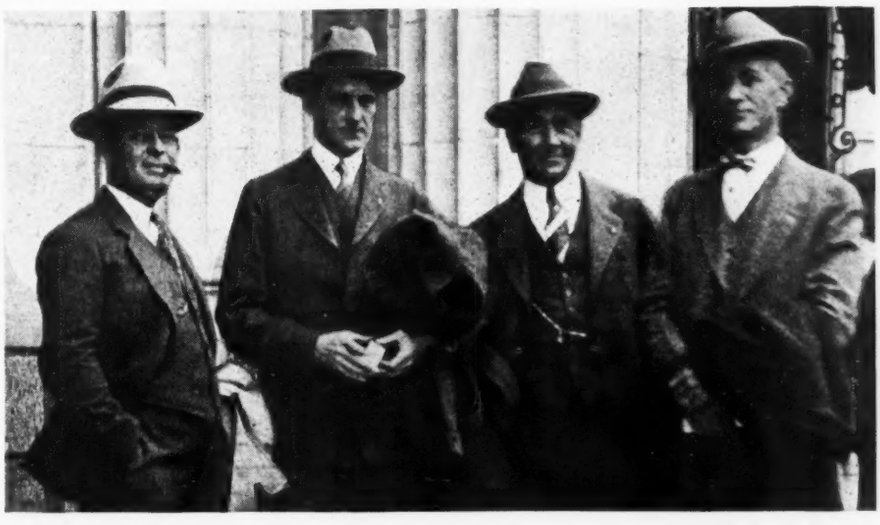
The San Luis Obispo tank farm is situated in a small valley about three miles south of the city of San Luis Obispo and one-half mile east of the Coast highway. Lying about six miles from the sea, it is the tidewater accumulation point for the Producers pipe line which extends from the San Joaquin valley fields to Port San Luis.

The storage facilities at this point consisted primarily of six reservoirs of usual California construction, ranging in capacity from 750,000 barrels to 1,300,000 barrels each. To the north and west of the reservoirs were 19, 55,000-barrel steel storage tanks.

At 7:35 a.m. on April 7, 1926, three reservoirs were ignited simultaneously by a lightning discharge. Fifteen minutes later a second lightning discharge fired the fourth and adjoining oil reservoir. After the fire had burned approximately 17 hours, all four reservoirs had a major boilover which crossed all fire walls and ignited a fifth reservoir as well as all but one of the first row of adjoining tanks. A few minutes later terrific whirlwinds swept the area apparently generated in the heat of the boilover and aggravated by the 40-mile gale which was blowing at the time from the southwest. Burning embers from the roof of the last reservoir ignited were scattered over the roof of the sixth reservoir. This roof was torn up by the whirlwinds and thus the sixth reservoir was added to the conflagration. Other steel tanks were set on fire by boilovers from the last two reservoirs and only five were saved out of the original nineteen.

Storm conditions similar to those at San Luis Obispo were responsible for the loss at Stewart, situated a mile west of the town of Brea, in Orange county. At 9:00 a.m. of April 8, 1926, a sharp stroke of lightning ignited two reservoirs simultaneously. Later, at the time of the boilover from these two reservoirs, a third was ignited and finally a small refinery with some of its tankage was engulfed in the burning oil. The pumping plant, all of the 55,000 barrel steel storage tanks (15 in number) and three reservoirs were saved.

Study of these fires and personal experience with them leads to a number of conclusions which may be briefly summarized as follows:



Left to right: H. K. Penny, assistant sales manager, D. & B. Pump & Supply Co., Dallas; William M. Culberson, general manager, Monongahela Tube Co., Pittsburgh; C. H. Homer, production superintendent, Rio Bravo Oil Co., Houston, and Tracy T. Word, T. T. Word Supply Co., Houston, at Tulsa

1. The fires in question were caused by lightning, but whether by direct stroke or induced discharge is not known.
2. When used for refining crude the typical California ground storage reservoir is hazardous from the standpoint of fire.
3. The location of oil storage reservoirs should be considered with great care, and adequate fire wall protection should be provided.
4. Tornadoes or twisters accompany great fires of this kind and may cause considerable damage.
5. Ordinary wood frame roofs with felt composition covers, as widely used on steel tankage, are fire hazards.
6. The boilovers observed followed the well known laws developed by recent experiments.
7. Fire walls should be fire and boilover resistant and should be carefully located.
8. Temporary fire wall structures must be fire resistant.
9. Fire fighting equipment should be located well outside any fire danger zone.

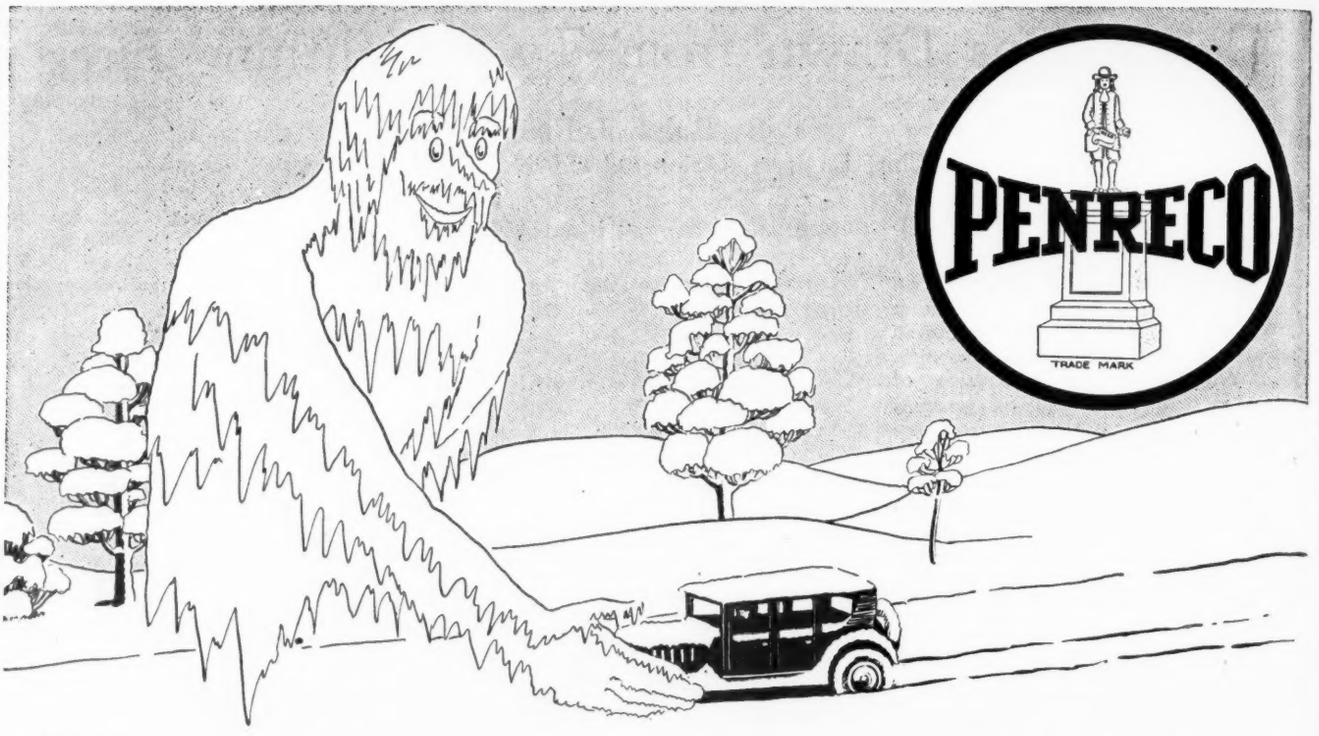
Compromise is Rumored in Patent Club Suit

WASHINGTON, Dec. 13.—Suggestions that there may be an attempt to compromise the government's anti-trust suit against the so-called cracking process club have been in circulation among responsible government officials for several days. It is being represented that the defendants would not be averse to the entering of a consent decree against them; that is that they are not as firmly convinced of the impregnability of the position they hold as they once were.

It is represented that members of the club are not, or in fact were not, relying on the Burton patents so much as on the Adams patents, when the issue was joined and that the assaults on the Adams patents have been so strong that a compromise would be welcome. The next move in the proceedings before the master who has been taking the testimony is the government's rebuttal testimony.

While there are such rumors or suggestions, it is impossible to put a finger on anything definite. Seemingly, all parties to any possible compromise are in position to deny that what have been taken to be trial balloons are not such, as a matter of fact. The things that have been so regarded may never be followed by any other and the case be allowed to go to a conclusion—a thing that has not been a fact in many recent anti-trust prosecutions.

The government has always been ready to compromise on such suits. Compromises allow it later to go into court to assert, if the Attorney General thinks it a fact that the compromise agreement has not been carried out; that the consent decree has not been followed and that the defendants should be punished for not having observed the anti-trust law as they had agreed.



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Care Needed to Keep Oil Field Boilers Up to Present Power Needs

By John R. Suman
Rio Bravo Oil Co., Houston
Delivered Before A. P. I. Convention, Tulsa, Dec. 8

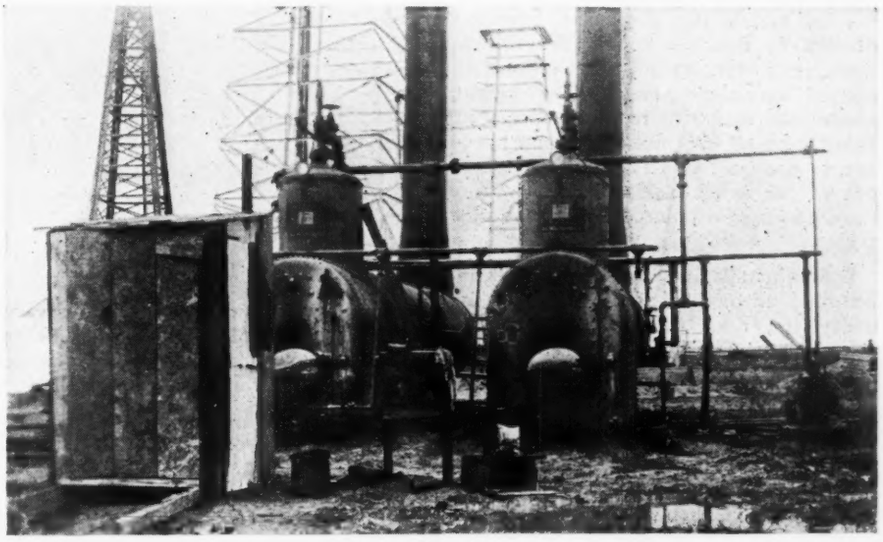
STEAM power plants are built in the oil fields for a number of other purposes than furnishing steam for drilling, and the proper design of such plants and other features of steam power plant operation is a subject so involved that it would be impossible to do justice to it in a short paper of this character.

Small oil field steam power plants built to furnish steam for operating air compressors, pipe line pumps, and so on are often made up of ordinary drilling boilers. The only difference between this type of installation and the installation for drilling purposes is that these boiler installations are usually housed and they are made up of six, eight, and even as many as 20 boilers in one battery. Therefore, these installations are simply an elaboration of an ordinary drilling well set up and some attention will be given to them.

In the old days, when wells were drilled with equipment of small horsepower, the operator simply set up one locomotive type boiler and this "pot", as the oil field worker called it, furnished all the steam needed to run the rig. It was supplied with water by a small injector and a two-inch steam line, led out of the dome to the drilling engine. Boilers of 25 and 30 horsepower were considered very adequate for the earlier operations.

Speaking particularly for the present day rotary drilling practice, where equipment of larger and larger horsepower is constantly being installed, it is safe to say that present boiler installations have not kept pace with power requirements. Therefore, the particular problems of how to get more steam out of a standard boiler setting is becoming increasingly important. This is especially true with the new rotary rigs using the new large size twin drilling engines and mud pumps with 12 and 14 inch steam cylinders. Very few operators realize the large amount of steam demanded by this heavy equipment.

Most of the rotary drilling wells at present have two or three 66 or larger horsepower boilers. These boilers set out in all kinds of weather, are very seldom, if ever, insulated, are commonly fired with oil burners, and very often have blowers in the stacks. On a cold or wet day a boiler setting of this character is using a large part of the generated steam to run this auxiliary equipment and overcome radiation losses.



Recommended type of flanged installation of steam headers. Fittings and valves should be heavy enough to withstand 250 pounds working pressure

Probably ten percent of the steam generated is being used in the boilers for atomization of the fuel. Probably another ten percent in being blown up the stack. Quite a large fraction is being used to operate the boiler feed apparatus and an enormous amount is being lost by radiation of heat from the outside of the boilers.

Detailed attention to these specific features of boiler installation will effect great economies in the amount of steam a given boiler setting would be able to furnish to the rig. Ordinarily operators are not concerned so much with saving of fuel oil, but they are vitally interested in getting more steam to the rig and this is exactly what will be accomplished when careful attention is given to these matters.

Boiler Feed Water

IN all steam power plant engineering great care is used to see that water of the proper characteristics is furnished the boilers. Elaborate water softening systems are often installed to prepare properly this water for steaming purposes. In the oil fields, however, the operator is principally concerned with how much water he can get and he very seldom if ever pays much attention to its chemical characteristics. If hard water gets into his boiler he can help the efficiency considerably by introducing the proper boiler compound to neutralize the deleterious effect of the particular chemical the boiler water may contain. There are numerous boiler compounds in the market which are available for this work. The companies making these compounds are always ready and anxious to cooperate with the operator in the selection of the proper compound for the treating of the particular water which may be at hand.

In most drilling installations the boilers are fed with cold water. One reason for this is that injectors always work better on cold water, and it is probably a fact that by far the majority of drilling rig boiler batteries are using injectors or inspirators for feeding water. This cold water entering the boilers not only decreases the steaming capacity of the boiler, but there is a tendency to set up temperature strains in the boiler metal in the vicinity of the point of injection.

There are numerous feed water heaters on the market which are semi-portable and could be used in any drilling rig set up. These feed water heaters when properly installed, in addition to increasing the steaming capacity of the boilers, assist in conserving the water supply. They also supply a better grade of water, as a considerable portion of the make up water consists of condensed steam.

The ordinary installation of two locomotive type boilers will be considered first. These boilers are usually

set side by side with the bottoms of the mud rims resting on a joint of pipe. The stack end of the boiler is then raised or lowered to make the barrels level. The boilers are usually set about three or four feet apart in Texas, but in other states they are commonly placed further apart.

The brick work is then built up under the fire box of the boiler. The exact nature of this brick work varies considerably and depends upon the manner in which the particular operator prefers to fire his boiler. The brick work, however, in all installations is carried up about two bricks height above the mud rim in the boiler. In firing with oil it is quite common practice in the Gulf Coast to build a target out of fire brick inside the boiler and the oil burner is pointed directly at this target.

Some installations have the burners installed through a hole immediately under the door of the boiler, while others introduce the burners from a circular opening in the brick work immediately under the base of the boiler. The Oil Well Supply Co. and the National Supply Co. recommend the burners be installed from the back side of the fire box underneath the mud rim and that they point downward in the general direction of the door of the boiler.

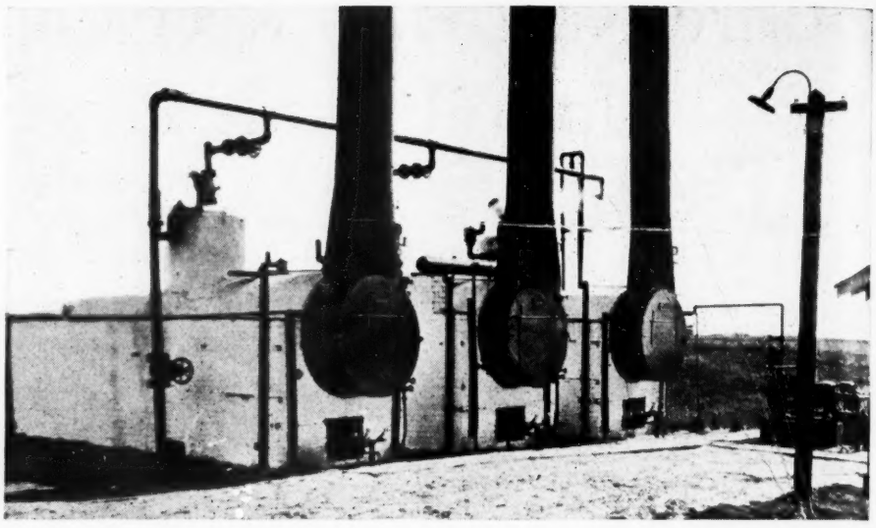
There is no question but that this latter installation effects a more economical use of the heat but it seems to be hard to get the operators to fire their boilers in this manner. This is probably due to the fact that the fireman has more trouble in gaining access to the burner because he has to get under the barrel of the boiler to get at it.

After the barrel of the boiler has been levelled and the brick work installed the stack is then raised. Stacks furnished by standard boiler manufacturers vary in length from 28 to 35 feet, according to the horsepower of boilers. Operators, however, are very prone to cut these stacks off, and in the Gulf Coast one sees many boilers in operation with stacks of 20 feet and less in length. Decreasing the length of the stacks, of course, cuts down the efficiency of the boilers and this accounts to a certain extent for the prevalence of the use of blowers in stacks. In many installations the use of a blower could be done away with by keeping the stack of the length furnished by the manufacturer.

In California the operators use quite commonly the return tubular type of boiler for carrying on drilling operations. This type of boiler requires a much different installation practice, in

Connecting Up Boilers

THE states of California and Oklahoma have regulations not only as to the proper design of boilers but also as to the installation of safety valves, blow-off cocks, water gauges, etc. These requirements, however, all follow very closely the A. S. M. E. boiler code. There are no regulations in Texas, insofar as the writer is aware, but the installation of boiler fittings in Texas follow very closely those in Oklahoma and California.



Shell Co. of California standard setup for return tubular type boilers

The operator, as stated before, is principally concerned in getting the maximum amount of steam and the highest possible amount of pressure delivered on the derrick floor to his equipment. It follows, therefore, that he should give the most careful attention to seeing that the connections from the boiler to the drilling equipment are of the proper design and dimensions. In this respect, however, the operator is very lax, and many complaints made that a boiler is not furnishing the proper amount of steam are directly due to the steam lines leading from the boiler to the drilling equipment not being of proper size.

The pipe leading from the boiler to the steam header should be designed to allow the steam under maximum conditions to obtain a velocity of well over 8000 feet per minute. The main steam header should have a cross-section area somewhat greater than this. The pipe from the boiler to the derrick should enter the header on top and the header should be properly trapped, to remove such moisture as may be brought off. It has been found that in standard practice where two horsepower boilers are in use, a three-inch steam header will about fulfill the above requirements.

The auxiliary equipment being run around the boilers should take the steam either from a separate line, or from the bottom of the main header so as to keep the steam going to the drilling rig as dry as possible. Where twin-cylinder drilling engines of 12 x 12 or larger size are used and with mud pumps having 12 x 14 inch steam cylinders it is desirable to have separate steam lines running from them to the boilers. These steam lines should either be 2½ or 3 inch size. Where it is desired to use but one line to the rig it should be four inch.

The writer once visited a drilling rig where only one two inch steam line ran into the rig from the boilers. This line led first to the pumps and from the pumps to the engine. The contractor drilling the well was wondering why his boilers did not furnish sufficient power. The boilers were all right but it was physically impossible to get the amount of steam required to the rig through one two inch steam line.

Design of Steam Headers Important

CORRECT design of steam headers over boiler installations is very important. These headers should be flanged on both ends and also flanged immediately under the "niggerhead." This allows the header to be conveniently removed upon moving from location to location and also gives easy access to fittings when steam leaks occur.

The Shell Co. of California have standardized on use of Crane automatic stop-check valves installed immediately above the boiler and below the main header. This is a fine idea, as in case of trouble with any one boiler backflow of steam into it is absolutely prevented.

Proper installation of pop-safety valves and blow-off cocks is very important and is watched closely by boiler inspectors. In Texas, however, pop-safety valves are not given such particular attention except that most contractors take precautions to see that, in installations where A. S. M. E. code boilers are used, pop valves are not allowed to pop under 225 pounds pressure. The writer recently visited a rig in the Gulf Coast where the boilers were being fired at 250 pounds steam pressure. Drilling equipment operated under 250 pounds steam pressure certainly gets more hole made in a given length of time, but this practice is not to be recommended with boilers now in use.

Where boilers of the proper horsepower to do the work required are installed it is very interesting to note the fuel economies which are effected. We

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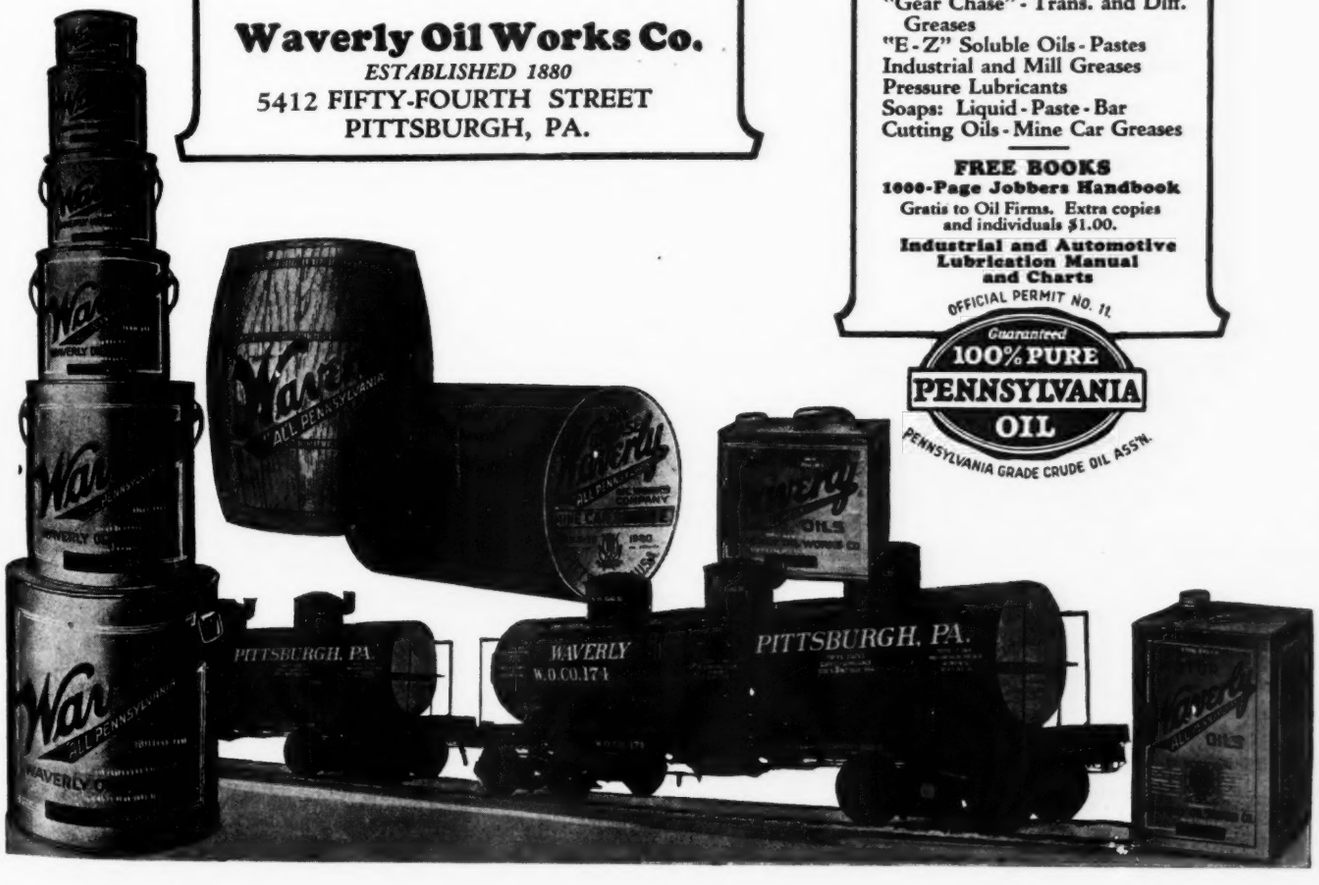


all know that, according to the A. P. I. specifications, a boiler horsepower constitutes ten square feet of heating surface and, of course, manufacturers are supposed to conform to this requirement. It so happens, however, that quite a few of the boilers now being made do not conform to this requirement.

Waste in Fuel

THE writer has had considerable experience with a certain make of 70 H. P. boiler, which has 765 square feet of heating surface according to the 1924 A. S. M. E. boiler code. Two of these boilers on a steam drilling job used about 40 barrels of fuel per day when fired at 150 pounds pressure. Another make of boiler of the same rating as to horsepower happens to have 873 square feet of heating surface. This boiler when fired at 160 pounds pressure required only 27 barrels of fuel per day. Both these boilers were operating drilling equipment requiring the same amount of steam.

The explanation of the difference in the fuel consumption lies in the fact that the boiler with the small amount of heating surface was being fired beyond its capacity and in its over-loaded condition was very uneconomical in fuel consumption. The first boiler was being fired with a blower in the stack, while the second boiler installation required no blower. We would infer from this that it behooves the operator to see that he has ample horsepower for the work he is doing.

Distance from Derrick Specified

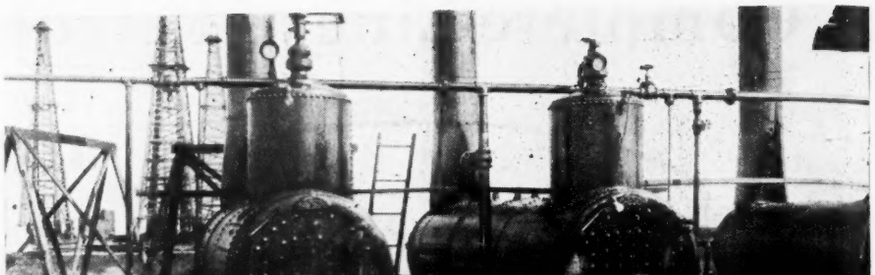
THE distance the boilers must be located from the derrick is usually specified in most states. In Texas the operator tries to get the boilers within a 100 feet or 150 feet of the derrick whenever possible. It is extremely important that dry steam be delivered to the drilling machinery. This is accomplished by having the steam lines as short as possible and also by having them properly insulated.

In addition to the insulation of the steam lines it is becoming common practice in the Gulf Coast to install steam traps at the point where the steam line reaches the derrick. These steam traps are usually combined steam traps and lubricators and are a great help to the proper operation of the drilling equipment. The Volz Steam Trap Lubricator is used very commonly in the Gulf Coast and in California.

As stated above the item in which the operator is primarily interested is getting the maximum amount of steam from a given installation. The changes in present practice which will be necessary to secure these results are as follows:

Housing of Boilers

IN TEXAS and Oklahoma severe weather conditions as concerns rain and cold weather are quite prevalent the greater part of the year. Uninsulated boilers exposed to the vagaries of these



Gulf Coast setup of 70 horsepower oil well drilling boilers

climatic conditions throughout the larger percentage of their steaming time are severely handicapped. It is a very simple matter to design a housing for drilling boilers which can be easily taken down and set up. The housing does not need to cover the entire boiler installation, but can extend from the back of the stack to the fire-box end of the boiler. If built close to the boiler it is very good protection against cold winds and rain.

Insulation of Boilers and Steam Lines

IT HAS been calculated that, in a boiler installation where steam is being generated at 150 pounds pressure per square inch, the heat losses per square foot of uninsulated heating surface per hour is about 960 B. T. U. In other words each square foot of exposed metal surface at 366 degrees Fahr. incident to 150 pounds gauge pressure will lose one pound of steam per hour, equivalent to approximately two barrels of fuel oil per year and 90 per cent of this loss may be saved by proper insulation of boilers. Of course, boilers must be moved from location to location and insulation becomes somewhat bothersome during the moving periods. However, one manufacturer is now bringing out a blanket insulation which can be strapped to the boiler in a very short order and can be removed very quickly.

While it is desirable to have the boilers within 100 feet of the drilling rigs it so happens that this is not possible in all installations. In some cases it may be necessary to have boilers as far as seven or eight hundred feet from the drilling rig. In these instances, and in most any case, it would pay the operator to insulate steam lines running from the boilers to the derrick with 85 per cent magnesium or similar pipe covering. This insulation should be covered with roofing paper to prevent moisture from getting to it. It goes without saying that all steam lines should be elevated above the ground.

As mentioned above, installation of portable or semi-portable feed water heaters of open type where boiler feed water is heated to 200 degrees is very desirable. The writer believes that this type of apparatus will come into more and more common use as time goes on.

Installation of Proper Burners

VERY little attention is paid in present drilling operations to proper installation of burners. Where fuel oil is being used more attention should be given to the selection of a burner which will generate the maximum heat and use the minimum steam. The ordinary burner being used is consuming about ten per cent of the steam generated by the boiler. Burners are available on the market and are used by industrial plants which use only two or three per cent of the steam being generated by the boilers. Of course, these burners get more attention than the standard oil field type, but it is the belief of the writer that burners should be selected and firemen should be instructed in their proper operation with a view to cutting down their high steam consumption. Properly designed burners will use less fuel oil, but, as stated before, this is not so vital a matter as the question of getting the maximum amount of steam to the drilling rig.

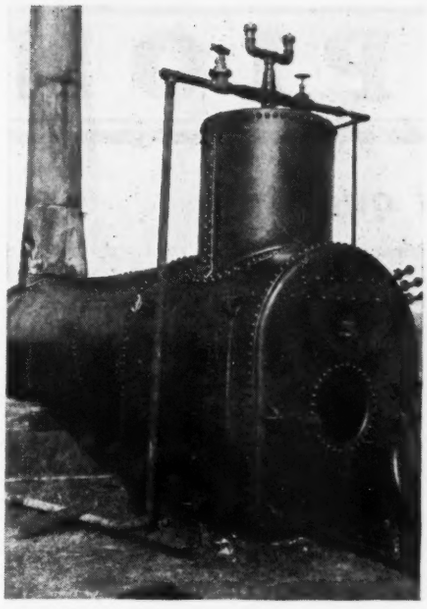
Nothing has been said thus far on the subject of gas burners. In all fields of flush production boilers are being fired with gas. As there is usually an abundant supply of this product little attention is given to its correct burning. The gas burner is ordinarily stuck in the door of the boiler and the fireman simply turns it up and down with a view to keeping the steam pressure as high as possible. Where gas is being purchased at so much a cubic foot operators are beginning to pay more attention to the correct installation of gas burners, also to the correct selection of gas burners. Several very high grade gas burners, (of both high and low pressure types), are now on the market and the use of these improved makes of burners, properly installed, is to be highly recommended.

The amount of attention which the inside of a boiler needs is directly proportional to the amount of sediment and chemical the boiler feed water con-

tains. Under ordinary conditions in the Gulf Coast it is required that boilers be blown off every 12 hours. It is also required that the flues be cleaned every 12 hours where fuel oil is being used. One source of trouble in operation of oil field boilers is the development of blisters on the mud rims and leaking of boilers around the mud rims. This is mostly due to the fact the boiler is not cleaned out often enough.

Blowing the boiler off every 12 hours will not remove a certain amount of sediment which has collected around the mud rim and it is necessary to cool the boiler off, empty it of water, and actually flush this material out through the handholes. This should certainly be done every time a battery of boilers is moved and if they stand in one location as long as 60 days it is desirable that this cleaning out of the mud rim be done every 30 days.

We also have trouble at times with the crown sheets of boilers. A warped crown sheet is caused by the fireman carrying the water too low. If the soft plugs in boilers are properly inspected at regular intervals a lot of this trouble would be eliminated; but quite often a soft plug will not give way when the crown sheet gets dry, due to the fact



Setup of single boiler for cable tool drilling in Oklahoma fields

that the accumulation of scale on it prevents the heat from being transmitted to the soft metal. This matter should be watched very carefully by the field foreman.

Of course, it seems that all boilers develop leaky flues at odd times. It so happens that flues often develop leaks at times when steam is most needed and it may be that some of this condition is due to the boilers being fired at higher than their rated horsepower. When flues are rolled the rolling operations should be carefully inspected.

Boiler Flues

VERY little attention is given in the field to the proper selection of boiler flues. Also very little attention is given by purchasing agents in the office in the purchase of boiler flues. It is believed a considerable amount of trouble could be saved the operators by more attention being given to this matter. We could probably learn a considerable amount about how to select boiler flues by paying attention to the work being done by the refiners in the selection of flues or tubes for stills. It is the belief of the writer that a pure iron tube would be a great saving over some of the tubes now in use. Some operators are calorizing their boiler tubes and report this is a great help in the preventing of accumulation of scale. Correct use of boiler compounds will often offset the accumulation of scale, and prolong the life of the tubes.

Finds Oils Go Off Color When Treated With Acid Containing Nitrogen

CLEVELAND, Dec. 9

PRESENCE of nitrogen compounds in sulfuric acid used for treating lubricating oils or light oils will cause those oils to go off color on standing, according to F. N. Williams, superintendent of the Gas Center, La., refinery of the Louisiana Oil Refining Corp. Mr. Williams set forth the results of experiments to determine this fact in the October issue of the Loreco Diamond, official magazine of the company.

Mr. Williams' article follows:

By F. N. Williams

THE function of sulfuric acid in the treatment of petroleum products is one of the most important. It serves to remove certain of the undesirable compounds carried through from the crude and is used in conjunction with other forms of chemical treatment, to turn out a finished product of highest quality.

It should prove of interest to describe briefly one particular point with regard to the quality of the acid itself, namely, that it is highly desirable for sulfuric acid to be free from nitrogen compounds. Small percentages of those compounds are sometimes found in sulfuric acid, particularly that which is manufactured by the "Lead Chamber" process, where the introduction of nitrogen compounds is a part of the method of manufacture. If nitrogen compounds are present in the acid they have a tendency to oxidize the intermediate products to the extent that the final results may be off color, which is undesirable when it is considered that color is an important part of the specifications of a number of petroleum products.

Experiments Carried Out

THE following experiments were made with a view to determining the effect of those nitrogen compounds in the acid on the final products. The results were obtained on a paraffin base lubricating distillate of 25.8 A.P.I. gravity. This distillate was refined from a Mid-Continent crude and represents an intermediate product from which lubricating oils are manufactured.

The oil was treated in an experimental agitator of three-gallon capacity and samples examined at various stages of treatment to ascertain color. Colors were determined by means of a Lovibond Tintometer, which is an instrument used for determining the colors of lubricating oils. In the case of that instrument the lower the number the lighter the oil in color. No. 1. Treated with 10 pounds per barrel of fresh commercial acid of 94.2 per cent acidity and containing .14 per cent of nitrogen trioxide.

Sample taken after agitation of acid and filtered through paper—color 16.

Treatment continued and sample taken after neutralization with caustic soda and washing with water—color 34.

Color of finished product 40 and same sample after standing 60 hours, 46 color.

It will be noted that the color of the final product deteriorates after standing, which is obviously undesirable.

Second Sample Tested

NO. 2. Treated with 10 pounds per barrel of recovered acid of 88.1 per cent acidity and free of niter gases.

Sample taken after agitation of acid and filtered through filter paper color 17.

Treatment continued and second sample drawn when oil neutralized and washed—color 17.

Color of finished product 18, and after standing 60 hours 18. The above tests were repeated on the same distillate eleven times and each time the results obtained were practically identical.

Results of tests made on 24.0 gravity paraffin base lubricating distillate were:

Treated with 15 pounds per barrel fresh commercial acid of 94.0 per cent acidity and containing .22 per cent of nitrogen trioxide.

Color after working acid, 30. Color after neutralizing, 40. Color finished

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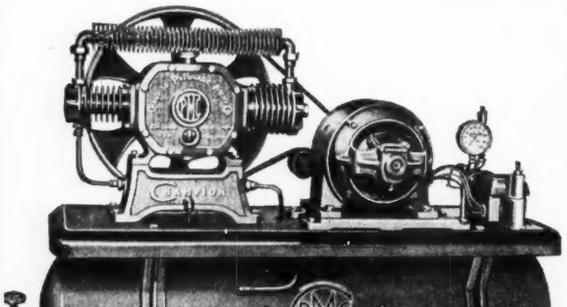

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product, 58. Color after standing 60 hours, 67.

Portion of same distillate treated with 15 pounds per barrel of recovered acid of 88.2 per cent acidity and free of nitrogen trioxide.

Color after working acid, 32. Color after neutralizing, 33. Color finished product, 34. Color after 60 hours, 36.

It will be noted that in the cases where the sulfuric acid was free from nitrogen compounds the sample showed very little darkening after standing 60 hours, which indicates a better product was obtained by the use of nitrogen free acid.

Tests made on crudes where a considerable amount of acid was used also exhibited remarkable differences in the color obtained in using the niter free acid and that which contained niter gases.

The following results were obtained on various grades of kerosene, some samples of which were retained exposed to the daylight while others were kept in the dark:

Tests On Kerosene

NO. 1—Kerosene, 44.4 A.P.I. gravity. 150 F. T. treated with 4 pounds per barrel of fresh commercial acid of 94.2 per cent acidity and containing .12 per cent of nitrogen trioxide. Color of finished product 23. Sample of same distillate treated with 4 pounds per barrel of fresh commercial acid of 94.2 per cent free of niter gases. Color of finished product 25 plus.

No. 2—Kerosene, 43.5 A.P.I. gravity and 94 flash. Treated with 8 pounds per barrel of commercial acid of 94.2 per cent acidity and containing .12 per cent of nitrogen trioxide. Color of finished product 15. After standing 15 days in dark, color 13 plus. After standing 15 days in light, color 12. Some of same oil treated with 8 pounds per barrel of niter free acid of 89.3 per cent acidity. Color of finished product, 16. After standing 15 days in dark, color 16. After standing 15 days in light, color 15.

Portion of same oil treated with 8 pounds per barrel of chemically pure sulfuric acid containing trace of added nitric acid: Color of finished product, 15; after 30 days in light, 12; after 30 days in dark, 13.

Chemically pure sulfuric acid containing .5 per cent of added nitric acid: Color of finished product, 7; after 30 days in light, below 0; after 30 days in dark, 4.

All colors and results obtained in experimental treatments of kerosene are the result of eight tests on each grade.

Sulfuric acid should be tested for nitrogen trioxide, etc. before being used for treating purposes. The determination can be made rapidly and accurately by means of the Lunge nitrometer, an instrument used for determining the nitrogen content of various substances.

Tennessee Inspection Law Fortified By ½-cent Privilege Tax

By Ward K. Halbert
N. P. N. Staff Writer

NASHVILLE, Dec. 13

TENNESSEE'S oil inspection law which dates back to 1877, is one of the state's most valuable antiques. It nets the general fund of the commonwealth upwards of $1000 a day besides maintaining a corps of 123 so-called "coal oil inspectors" on salaries. These alleged public servants, oil men say, rarely make any gesture by way of earning their ridiculous incomes of $10 to $100 a month. They are patently pensioners of the administration. Probably a dozen of them draw more than $400 a year.

The ridiculous old statute is pretty much scratched up and plastered over with amendments but it has stood the test of nearly 50 years and half that many legislatures. Two years ago a little storm was seen gathering over the head of the revenue department and the administration feared for the safety of the faithful old collector of tribute, the Oil Inspection Law, so with speed another law was framed and passed to take the place of oil inspection any time it might be killed.

The new law is Chapter 54 of the Acts of 1925. It is short and its provisions are simple. It went into force immediately and provides that marketers of gasoline, kerosene, or any kind of motor fuel, must pay a special privilege tax of ½ cent a gallon on all merchandise sold without being inspected and on which the inspection fees have not been paid. In short. Tennessee oil men may choose between paying inspection fees or ½-cent privilege tax. There is little preference between them. The inspection fee is a little cheaper but also a little more trouble to carry out.

Supreme Court Uphold Statutes

THE validity of the act has been tested. The Supreme Court of the state decided last fall the enactments were valid and constitutional. Moreover the Supreme Court interpreted the intention of the legislature to make oil inspection a means of procuring revenue. Quoting from the court's opinion—"These statutes indicate a fixed policy and express a manifest purpose on the part of the legislature to impose the fees as a means of revenue in so far as the fees may exceed the cost of inspection."

The validity of the inspection law and the special privilege tax law were contested in a test case between the state and the Reed Oil Co., with distribution in Memphis and Nashville. Reed Oil Co. is headed by Jack Reed of Memphis and is the distributor of Parco gasoline in Tennessee. This company began action by refusing to pay inspection fees or the privilege tax either about July 1, 1924. The state brought two suits against the Reed Oil Co., one under each law, but the two suits were consolidated into one test case while pending in the chancery court in Nashville.

Under the agreement between Mr. Reed and the state he, and certain other oil jobbers who went into the litigation with him, paid their inspection fees to the American National Bank of Nashville, beginning Jan. 1, 1926, and continued to impound the money there until the case was decided. The bank agreed to hold the money in escrow, pay 3 per cent interest on it and finally to pay it to the winner of the test case. About eight months were required to adjudicate the case but the Supreme Court handed down its decision early last August and on Aug. 20 the state treasury got the impounded money, upwards of $100,000 of which Reed Oil Co. paid approximately $16,700.

Tennessee is "Half Soled"

FROM the outcome of this case it looks as if Tennessee had "half soled" its old oil inspection law with a new special privilege tax and had been successful in making it water tight. And with the ruling of the Supreme Court that oil inspection is a means of raising money and not a safety measure, it can not be attacked as a police measure used to exact tribute.

In the matter of oil inspection, Tennessee is the most severe of all the states in collecting from oil companies. The original oil inspection law which became effective in 1877 was enacted on the theory that it prevented the sale of kerosene with a flash point under 120° F. Of course, no such burning oil has been on the competitive market in the United States for 20 years or so, but Tennessee still has it inspected, or pretends to, and charges 30 cents a 50-gallon barrel for that meaningless ceremony.

In 1917 the law was amended to include gasoline, and the state charges 20 cents a 50-gallon barrel for taking a gravity test on it. Since the 50-gallon barrel is used but little now for shipping gasoline and kerosene the inspection is on a gallonage basis, i.e., 0.6 cent a gallon on kerosene and 0.4 cent on gasoline. The average is ½ cent a gallon and when the privilege tax was passed it provided a flat fee of ½ cent. In this way the privilege tax is higher than inspection fee because most jobbers handle a much greater volume of gasoline than kerosene, and gasoline inspection is cheaper.

Tennessee is not the only one with an oil inspection law, of course, but when it comes to getting money for it, Tennessee heads all the 48. According to the latest available information on oil inspection, six states have no inspection laws; 26 have inspection statutes but exact no fees, and 10 impose fees

Confessions of a Tax Administrator

"I AM from Tennessee. We have the poorest oil inspection system in the world, I guess. We do it mainly to get $600,000 a year. We can't give up the $600,000 but we can afford to give the oil men a little more for their money. I want to learn something about this oil inspection business to take back with me."

The foregoing little speech was made to the assembled conference of gasoline tax administrators and oil inspectors in the Statler hotel, St. Louis, Nov. 11, by W. S. Booton, Esq., director of the excise tax division of the Tennessee state government. Later in the conference Mr. Booton said further:

"Al D. McKnight is the leading spirit in, if not the unchallenged leader of, the Tennessee Oil Jobbers' Association. * * * As Representative McKnight in the 64th General Assembly, 'Al D' co-operated to keep our gasoline tax popular; and as Senator McKnight in 65th General Assembly he is going to keep on co-operating to keep it popular. Yet this same man is plumb poison against inspection!

"He complains incessantly of the inadequacy of our inspection system and what he terms the limitless obfuscation of the argument that inspection is essential for public protection. An attempt to convince Al D. McKnight that inspection is founded upon a thing except pragmatism, is a waste of time."

under 10 cents a barrel. That accounts for all but six.

North Dakota has a high fee but it is not imposed altogether for revenue. The three chief offenders are Alabama, Georgia and Tennessee, and the most conspicuous is Tennessee. Georgia has a special tax of 25 cents a barrel on gasoline, and Alabama charges 25 cents a barrel for inspecting kerosene.

CONSIDERING these three states grouped in the southeastern quarter of the country, one might imagine there was something climatic about oil inspection, so in justice to the "Land of Cotton" it should be remembered that three of the six states where inspection is unknown are Maryland, Mississippi and Virginia.

Oil inspectors in Tennessee are appointed by elective officers. They change with the administration, ordinarily. Since women began to vote there have been few skirted oil inspectors. This is due partly to the scale of pay. Salaries are too low to interest able bodied men. The last legislature appropriated $38,000 to pay the salaries and expenses of its 123 inspectors for two years. That will average less than $160 a year.

The pay of inspectors is computed upon the population of the community where they hold forth. That rule went into effect in 1899 when the 1877 law was first amended. It was then that the open cup method of testing illuminating oil was written into the law. Like the rest of the act, it was reasonably well suited to its day and age, but salaries of $100 a year, along with kerosene of 120° flash, have gone the way of the corset and the hitching post.

"Render Unto Caesar"

THERE was a time in Tennessee when most homes and business places were lighted with kerosene lamps. Then, but not now, there was some relation between the population of a town and its kerosene consumption. Today the rural places use more than the larger towns. There is still some relation between the size of a town and the number of votes a candidate may expect to glean from it by the appointment of a popular oil inspector. The larger the town the more votes and the more liberal salary for the appointee.

The general practice is to appoint worthy old persons, dear to their neighbors, the lame and the halt and maybe even the blind. Such characters can hobble around to the oil man's office occasionally and pick up the bottles he has saved for them. They can tell him that his kerosene is above 120 flash which, of course, the oil men well knew when he got the bill from the refiner. Had it been under 120 flash he would have paid more for it. These same men can test gasoline in full compliance with the law too. They can immerse a hydrometer in it at $40 per baptism. But the state gets most of the money. The pay of inspectors has not increased much in recent years although the income to the state has multiplied.

The legislature meets during the first three months of odd-number years. Expenses and disbursements are computed for each biennial period. The following table shows the amounts collected per two-year period, and the cost of collecting it for 10 years back. Note the difference in growth of the two figures:

Biennial Period	Amount Collected	Cost of Collecting
1915 to 1917	$163,948.10	$24,364.79
1917 to 1918	317,912.75	27,783.71
1918 to 1920	401,468.53	24,321.85
1920 to 1922	645,455.93	36,229.52
1922 to 1924	769,725.03	38,784.79

I. C. C. Rules Casinghead Remixed With Crude Takes Lower Rate

WASHINGTON, Dec. 11—Casinghead gas, extracted from crude in the process of pumping, when condensed, may be restored to the crude and the mixture, in the future, may be moved by rail without the payment of penalty rates, as at present. It has been so decided by the Interstate Commerce Commission, not, however, without marked dissention.

At present when such a mixture moves it has to be described as gasoline and pay the gasoline rate, which, in most of the country, is about 25 per cent higher than the rate on crude and heavy products.

The decision means that the railroads will not be allowed (if they contemplated such a step) to subject crude, produced by forcing the excess gas back into the sand, to pay the gasoline rate. In other words, the railroads will not be permitted to retard the true conservation policy of the producing end of the oil industry by claiming that crude produced by the restoration to the sand, of the gas that was once part of it, had become a mixture of gas and crude and therefore subject to the refined oil rates.

Fayette B. Dow, Washington representative of the American Petroleum Institute, the National Petroleum Association and the Western Petroleum Refiners Association, associated in the case with C. D. Chamberlin, the veteran traffic lawyer of the industry, fought the question to a favorable issue in National Refining Co. and Canadian Oil Co., Ltd., vs. Louisville & Nashville et al. It took about three years and was an uphill fight, all the time. In August, 1922, the regulating body informally ruled that because producers in the Somerset or Big Sinking field in eastern Kentucky, condensed their casinghead gas and ran it back into the crude, the mixture, more than 3000 tank carloads, was subject to the gasoline rate, which, in this instance, was only 1.5 cents per 100 pounds.

The refining companies filed a formal complaint after that adverse informal ruling which carried with it a hint of the penitentiary, because falsely describing something shipped carries such a penalty. The examiner who heard the testimony recommended that the rate body stand by its informal ruling. Dow argued on that recommendation before a division of the rate body pointing out, among other things, that if the Commission stood pat it raised the question whether the crude produced from wells in fields in which gas had been forced back into the sand, would not be subject to the higher finished product rates. By allowing such a question to be raised he said the rate body would menace one of the great steps the industry had taken to conserve petroleum resources, that of putting gas back into the sand.

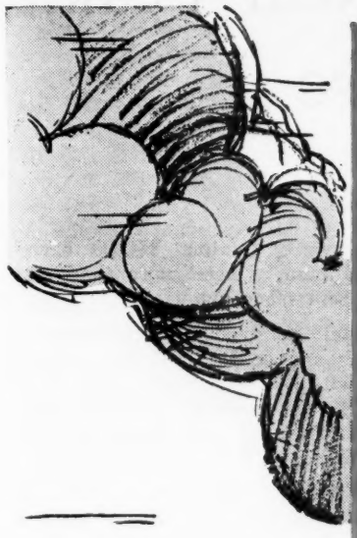
More testimony was taken. Elaborate tests were made and they showed that the mixture shipped, when subjected to the usual tests, showed characteristics well within the range of those exhibited by crudes shipped at the crude rates, from the east Kentucky and other fields, to which no natural gasoline had been added.

Dow showed that unless the producers had been allowed to run their condensate back into the crude, they could not have sold their production to the National and Canadian companies. They could not have afforded to pay refined rates on the production to the refineries in Toledo and Findlay, O., and Petrolia, Ont.

The Somerset producers, it was shown, had no market for their "casinghead gas" or natural gasoline. The Somerset wells had to be pumped from the start. They never flowed. They showed no gas pressure. When the vacuum pump was used it was found that it "tore" casinghead gas out of the crude. Other pumping processes did not cause the rupture. After the adverse informal ruling in 1922, other arrangements were made for disposing of the products. But the item of undercharges on more than 3000 cars caused the two refiners to fight, even if the bill was only about $25,000.

Between 6 and 7 per cent of the mixture consisted of natural gasoline, which the testimony showed had been torn from the crude by the vacuum pump process.

The regulating body divided, seven to four, in favor of the decision as made. Commissioner Hall, dissenting, said the decision was an entering wedge. He called "casinghead gasoline" a manufactured product of petroleum and wanted to know if it could be mixed with crude and the resultant liquid shipped at the crude rate, why could not the same be done with the liquid resulting from the mixing of crude and a manufactured product, e.g., gasoline, kerosene or naphtha? Three other Commissioners objected to giving the crude rate to the product of an operation, such as described.



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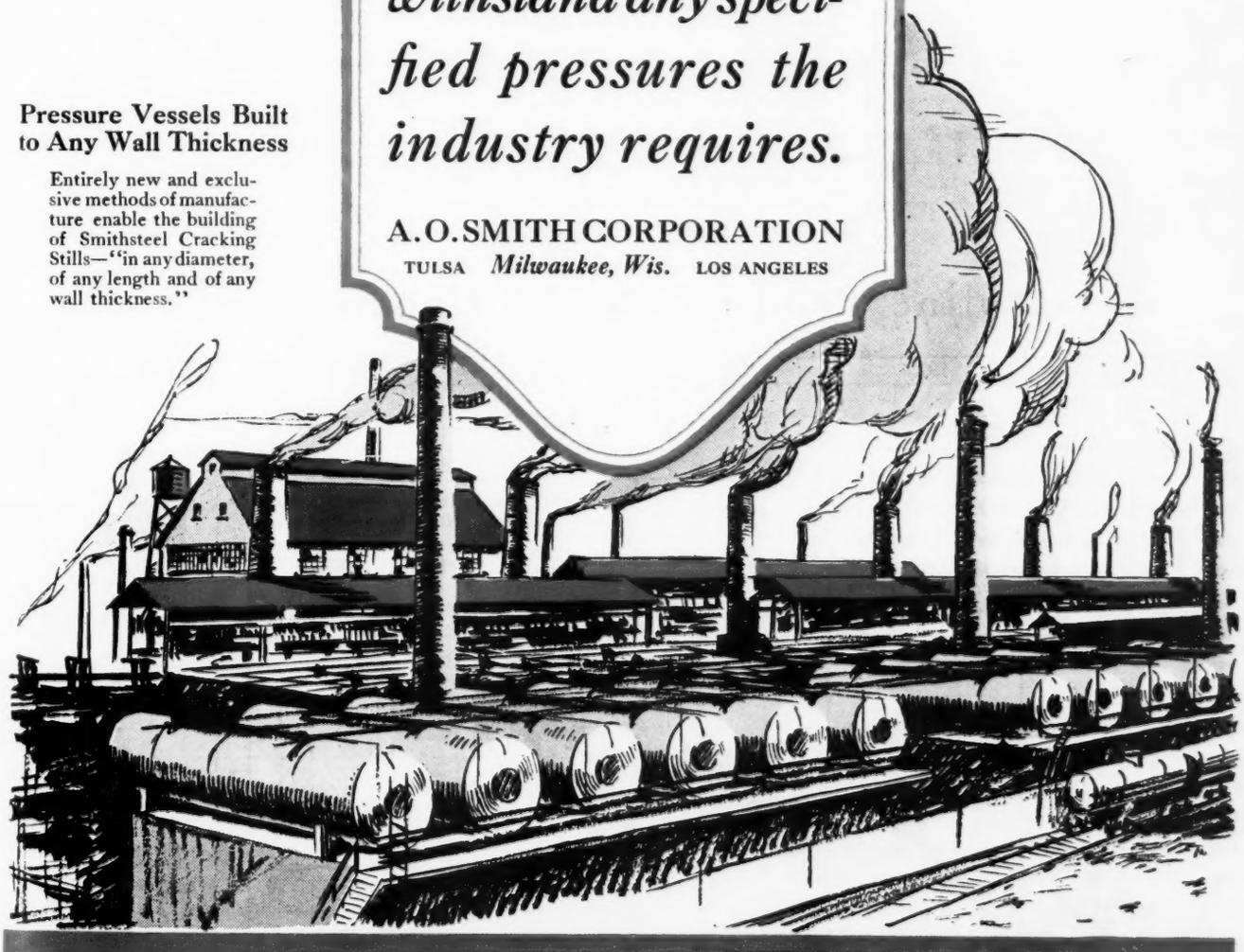


SMITHSTEEL
CRACKING STILLS

Crude Production Again is Near Peak; Stocks of Gasoline Rise

By Roger B. Stafford
N. P. N. Staff Writer

CLEVELAND, Dec. 11

BUREAU of Mines petroleum statistics for October, compiled by G. R. Hopkins, reveal these facts:

1. Total above ground stocks of crude and refined oils were 181,000 barrels lower Oct. 31 than on Sept. 30. The decrease in stocal stocks in September was 2,695,000 barrels and in August 5,324,000 barrels.

2. Stocks of all oils Oct. 31 were 34,000,000 barrels less than on Oct. 31, 1925.

3. Production of crude oil was more in October than in September and October, 1925. Daily average production in October, 1926, was 2,222,100 barrels, an increase of 45,300 barrels over the September average.

4. Total demand for all oils was slightly more but daily average demand was slightly less in October than in September. The October average was 2,409,400 barrels and September average 2,449,200 barrels.

5. Daily average demand, domestic and export, for all oils in October was 5000 barrels less than daily average new supply—production plus imports of crude and refined oils. In September the deficiency in new supply was 90,000 barrels daily average, and in August 172,000 barrels.

6. East of California stocks of light crude increased 2,500,000 barrels but stocks of heavy crudes decreased 3,000,000 barrels. In California stocks of both light and heavy crudes were decreased a little. For the whole country crude oil stocks decreased 647,000 barrels.

7. Gasoline stocks increased 365,000 barrels. This was the first increase since March. Oct. 31 stocks were 33,706,000 barrels compared with 35,910,000 barrels Oct. 31, 1925.

8. Gasoline output by American refineries averaged 831,032 barrels daily, the largest production ever attained. Gasoline imports, totaling 874,000 barrels for the month, were more than three times September imports.

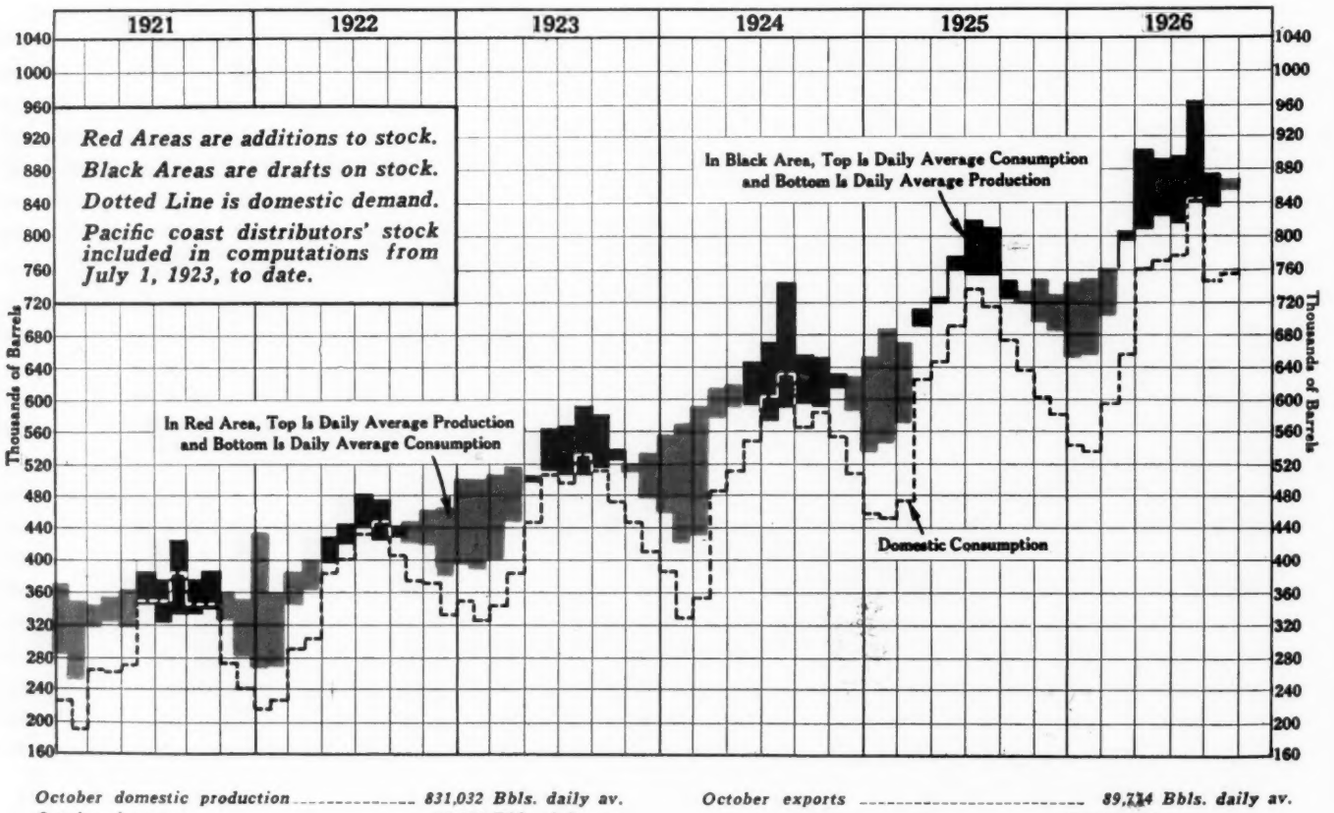
9. Domestic gasoline consumption in October averaged 757,677 barrels compared with 748,300 barrels in September. Exports of gasoline averaged 89,774 barrels compared with 128,433 barrels in September.

10. Kerosene stocks increased 79,000 barrels. Domestic shipments and exports decreased and output was lower than in September.

11. Domestic demand for lubricating oils fell almost 250,000 barrels in October from September demand and with a small increase in total output stocks rose 288,000 barrels. Exports were slightly lower than September exports.

12. Wax stocks rose more than 8,000,000 pounds with an increase of more than 6,000,000 pounds in production. Exports of wax were slightly lower than in September but domestic

Gasoline Production and Consumption



October domestic production	831,032 Bbls. daily av.
October imports	28,193 Bbls. daily av.
Total new supply	859,225 Bbls. daily av.
October domestic shipments	757,677 Bbls. daily av.
October exports	89,774 Bbls. daily av.
Total indicated demand	847,451 Bbls. daily av.
Stocks Oct. 31, 1926	33,706,000 Bbls.
Increase in stocks in Oct.	365,000 Bbls.
Stocks Oct. 31, 1925	35,910,000 Bbls.

demand fell approximately 4,500,000 pounds.

13. Gas and fuel oil stocks east of California fell 875,000 barrels although production was increased approximately 1,750,000 barrels.

14. Natural gasoline production rose more than 5000 barrels on daily average to 93,755 barrels. Stocks Oct. 31 were 5000 barrels less than stocks Sept. 30.

15. Daily average runs of all oils to stills was 2,398,500 compared with 2,386,833 barrels in September. October runs were largest in history of the industry.

Crude Production Near Record

THE daily average crude production, 2,222,100 barrels, was an increase of 2 per cent over September production and was the second largest volume of production in the history of the American petroleum industry. Largest daily average production was in June, 1925, when it was 2,241,000 barrels. It is probable that November statistics which will be available early next month, will show November to have been the record for all time.

The increase in October production is attributable directly to the Seminole field of Oklahoma and the Panhandle field of Texas, although California production rose more than 8000 barrels, daily average, to 611,800 barrels.

Texas production for October totaled 574,900 barrels, daily average. Of that average 429,300 barrels was from fields outside the Gulf Coast, where production was 145,600 barrels or 3400 barrels less on the average than in September. In October, 1925, Texas production totaled 361,581 barrels daily average.

Oklahoma production averaged 511,200 barrels daily, a gain of 33,100 barrels in the daily average over September. Oklahoma's daily average was 25,100 barrels greater in October than in October, 1925. California's production in October was 34,000 barrels less on the average than in the same month of 1925.

Excepting a gain of 100 barrels in the average Michigan crude production, no other state showed a gain in October over September. Arkansas daily average production fell more than 8000 barrels; Louisiana 5500 barrels, and Montana almost 3000 barrels.

52,000-Bbl. Gain in Southwest

TOTAL production in the Mid-Continent field in which is classified everything in the southwest except the Gulf Coast, daily average production was 1,254,700 barrels, in October, compared with 1,202,700 barrels in September, but for the first 10 months of this year Mid-Continent production at 342,328,000 barrels total is 14,878,000 barrels less than in the corresponding 10 months of 1925.

Production for the whole country in the first 10 months of this year was 624,803,000 barrels compared with 640,269,000 barrels in the first 10 months of 1925.

Refiners reduced their stocks of crude oil 1,000,000 barrels in October. Pipe line and tank farm stocks of crude east of California were lowered by 611,000 barrels. The fall in volume of California stocks was so small that practically they were stationary. Crude oil stocks at the end of each month of 1925 and 1926 have been:

(Thousands of Barrels)

1925	*East of Calif.	†In Calif.	Total U. S.
January	319,338	100,026	419,364
February	318,582	101,729	420,311
March	316,915	103,721	420,636
April	317,051	106,605	423,656
May	319,904	110,081	430,075
June	318,672	112,395	431,067
July	316,139	115,799	431,938
August	311,129	120,073	431,202
September	308,925	124,483	433,408
October	305,892	127,450	433,342
November	304,534	128,934	433,468
December	299,367	129,434	428,801
1926			
January	291,400	130,841	422,241
February	287,975	131,638	419,613
March	287,710	131,678	419,388
April	286,208	124,290	410,498
May	284,009	125,359	409,368
June	281,432	122,794	404,533
July	278,184	121,344	399,528
August	277,486	119,893	397,379
September	277,771	117,964	395,735
October	277,160	117,928	395,088

*For 1925, but not for 1926, producers' stocks included on Dec. 31 these amounted to 7,560,000 bbls. †Includes heavy fuels.

Petroleum Supply and Demand—Barrels

	October 1926	†September 1926	August 1926	October 1925
Total stocks end of preceding month	515,030,000	517,725,000	523,049,000	550,335,000
Domestic Crude Production				
Light	56,436,000	53,516,000	54,159,000	51,763,000
Heavy	12,450,000	11,784,000	12,366,000	13,079,000
Imports of Crude Oil	3,860,000	4,350,000	5,332,000	4,367,000
Imports of Refined Oils	1,764,000	1,131,000	2,360,000	951,000
Total supply all oils	589,540,000	588,506,000	597,266,000	620,495,000
Exports of Crude	1,010,000	1,388,000	1,083,000	1,292,000
Exports of Refined	7,613,000	9,366,000	10,696,000	8,521,000
Domestic demand, crude and refined	66,068,000	62,722,000	67,762,000	62,026,000
Total demand	74,691,000	73,476,000	79,541,000	71,839,000
Total stocks end of month	514,849,000	515,030,000	517,725,000	548,656,000
Decrease in Stocks	181,000	2,695,000	5,324,000	1,679,000
Daily Average New Supply	2,404,000	2,359,000	2,394,000	2,263,000
Daily Average Demand	2,409,000	2,449,000	2,566,000	2,317,000
Daily Average Deficiency	5,000	90,000	172,000	53,000
Crude Stocks				
East of California: Light	222,957,000	220,419,000	220,444,000	298,193,000
Heavy	54,203,000	57,352,000	57,042,000	*
In California: Light	30,467,000	30,489,000	32,124,000	44,059,000
Heavy	87,461,000	87,475,000	87,769,000	83,391,000
Total Stocks of Crude	395,088,000	395,735,000	397,379,000	425,643,000
Total Stocks of Refined	119,761,000	119,295,000	120,346,000	123,013,000

†Revised. *Included in preceding item.

Gasoline Demand and Supply—Barrels

	Production	Imports	Exports	Domestic Shipments	Stocks End of Month
January, 1925	20,043,000	344,000	2,255,000	14,386,000	34,569,000
February	19,182,000	287,000	2,456,000	13,210,000	38,372,000
March	20,631,000	346,000	2,947,000	14,890,000	41,512,000
April	20,752,000	244,000	2,600,000	19,013,000	40,895,000
May	21,996,000	404,000	2,362,000	20,459,000	40,474,000
June	22,488,000	384,000	2,706,000	20,724,000	39,916,000
July	23,073,000	401,000	2,504,000	22,879,000	38,007,000
August	23,191,000	314,000	2,953,000	22,323,000	36,236,000
September	21,573,000	182,000	2,242,000	20,177,000	35,572,000
October	22,488,000	214,000	2,538,000	19,826,000	35,910,000
November	21,946,000	373,000	2,842,000	18,024,000	37,363,000
December	22,238,000	320,000	3,092,000	17,954,000	38,875,000
Total 1925	259,601,000	3,813,000	31,497,000	223,865,000	.....
January, 1926	22,593,000	384,000	3,421,000	16,788,000	41,643,000
February	20,560,000	408,000	3,245,000	15,112,000	44,254,p00
March	23,084,000	517,000	3,186,000	18,556,000	46,103,800
April	23,515,000	454,000	4,402,000	19,796,000	45,874,000
May	24,509,000	621,000	4,529,000	23,568,000	42,907,000
June	24,238,000	464,000	3,744,000	23,073,000	40,792,000
July	24,927,000	460,000	3,702,000	24,162,000	38,315,000
August	25,416,000	674,000	3,572,000	26,282,000	34,551,000
September	24,834,000	258,000	3,853,000	22,449,000	33,341,000
October	25,762,000	874,000	2,783,000	23,488,000	33,706,000
Jan.-Oct., 1926	239,438,000	5,114,000	36,437,000	213,284,000	.....

Crude Production—Barrels

(Daily Averages)

States	October 1926	*September 1926	†October 1925
Arkansas	148,000	156,600	206,097
California	611,800	603,500	645,648
Colorado	6,400	8,100	4,613
Illinois	21,000	22,000	21,839
Indiana	2,100	2,200	2,129
Kansas	115,400	116,100	111,387
Kentucky	17,400	17,700	17,868
La. Gulf Coast	8,800	11,500	11,129
Rest of State	50,800	53,600	44,258
Michigan	400	300	...
Montana	18,500	21,400	15,290
New Mexico fl	4,500	5,200	4,677
New York	5,700	5,700	4,806
Ohio cent.-east	14,600	15,100	14,710
Northwest	5,000	5,300	5,194
Oklahoma	511,200	478,100	486,126
Pennsylvania	25,800	26,000	21,903
Tennessee	100	200	68
Tex., Gulf Coast	145,600	149,000	78,129
Rest of State	429,300	398,300	283,452
West Virginia	16,800	17,300	16,258
Wyo. Salt Creek	43,200	43,400	61,097
Rest of State	18,700	20,200	19,193
Total U.S.	2,222,100	2,176,800	2,075,871
CLASSIFICATION BY GRAVITY			
24°A.P.I. and lighter	1,820,500	1,784,000	1,462,032
Heavier than 24°.	401,600	392,800	613,839

*Revised. †Final figures.

Daily average charges to stills of all oils,—crude, rerun oils and natural gasoline were 12,000 barrels larger in October than in September. Atlantic Coast refineries increased runs 23,000 barrels daily average; Appalachian

plants 1000 barrels; Texas plants 30,000 barrels and Rocky Mountain plants 4000 barrels—a total gain of 58,000 barrels in daily average runs in these areas. Indiana-Illinois plants reduced runs 3600 daily average; Oklahoma-Kansas plants 20,000 barrels, Louisiana-Arkansas plants 2400 barrels and California plants 20,000 barrels—a total curtailment of 46,000 barrels daily average for these districts.

Kerosene, Lubes, Wax, Gas and Fuel Oils

KEROSENE (Bbls.)	Production	Imports	Exports	Domestic Shipments	Stocks End of Month
January, 1926	5,113,000	.....	1,871,000	3,515,000	6,843,000
February	4,714,000	1,000	1,577,000	3,129,000	6,857,000
March	5,485,000	1,000	1,785,000	3,560,000	6,998,000
April	5,012,000	1,000	1,642,000	3,355,000	7,014,000
May	5,193,000	4,000	1,623,000	3,211,000	7,378,000
June	4,995,000	3,000	1,604,000	2,895,000	7,877,000
July	4,862,000	21,000	1,612,000	2,709,000	8,439,000
August	5,149,000	20,000	2,639,000	2,733,000	8,186,000
September	5,191,000	21,000	1,843,000	3,396,000	8,159,000
October	5,102,000	3,000	1,818,000	3,208,000	8,238,000
Jan.-Oct. Total	50,816,000	75,000	18,064,000	31,710,000	.....
October, 1925	5,123,000	2,000	2,094,000	3,451,333	7,976,000
LUBRICANTS (Bbls.)					
January, 1926	2,649,000	2,000	727,000	1,633,000	7,544,000
February	2,426,000	1,000	789,000	1,273,000	7,909,000
March	2,623,000	4,000	740,000	2,156,000	7,604,000
April	2,670,000	3,000	913,000	2,032,000	7,368,000
May	2,856,000	11,000	715,000	1,864,000	7,656,000
June	2,682,000	3,000	984,000	2,043,000	7,314,000
July	2,847,000	1,000	746,000	2,089,000	7,327,000
August	2,836,000	2,000	660,000	2,279,000	7,226,000
September	2,645,000	2,000	705,000	2,019,000	7,149,000
October	2,768,000	2,000	701,000	1,778,000	7,437,000
Jan.-Oct. Total	27,003,000	31,000	7,683,000	19,166,000	.....
October, 1925	2,608,000	1,000	757,000	1,788,000	6,824,000

WAX (Pounds)	Production	Imports	Exports	Domestic Shipments	Stocks End of Month
January, 1926	52,630,000	631,000	29,061,000	17,818,000	122,773,000
February	49,922,000	668,000	28,709,000	20,690,000	123,964,000
March	55,329,000	456,000	25,005,000	24,403,000	130,341,000
April	54,985,000	647,000	31,560,000	18,329,000	136,084,000
May	56,050,000	213,000	23,968,000	18,983,000	149,396,000
June	50,672,000	812,000	27,211,000	18,415,000	155,254,000
July	54,267,000	2,089,000	30,768,000	24,138,000	156,704,000
August	54,440,000	968,000	26,906,000	20,141,000	165,065,000
September	49,228,000	252,000	29,303,000	25,463,000	159,779,000
October	56,011,000	1,384,000	28,365,000	20,884,000	167,925,000
Jan.-Oct. Total	533,534,000	8,120,000	280,856,000	209,264,000	.....
October, 1925	50,182,000	734,000	32,961,000	12,985,000	113,649,000
GAS and FUEL OILS (Bbls.)					
January, 1926	29,319,000	863,000	3,612,000	.....	*23,266,000
February	27,067,000	1,585,000	3,190,000	.....	*21,445,000
March	29,642,000	947,000	2,345,000	.....	*20,267,000
April	28,827,000	1,148,000	3,475,000	.....	*19,773,000
May	30,321,000	1,368,000	2,737,000	.....	*20,841,000
June	29,236,000	1,856,000	3,370,000	.....	*22,554,000
July	31,351,000	1,485,000	2,427,000	.....	*25,696,000
August	31,056,000	1,629,000	3,582,000	.....	*26,500,000
September	30,620,000	817,000	2,750,000	.....	*27,200,000
October	32,362,000	857,000	2,015,000	.....	*26,376,000
Jan.-Oct. Total	299,801,000	12,555,000	29,503,000	.....	.....
October, 1925	31,468,000	731,000	2,897,000	.....	*28,948,000

*These stocks for east of California only.

Gasoline

Gasoline production was reduced in the Appalachian, Indiana-Illinois

(Continued on page 79)

Stocks of Crude Oil

(Domestic unless otherwise specified. Amounts in Thousands of Barrels)

AT REFINERIES

Districts	Oct. 31 1926	*Sept.30 1926	†Oct.31 1925
East Coast			
Domestic	9,271	9,145	6,079
Foreign	2,220	2,648	2,290
Appalachian	1,675	1,688	1,374
Indiana, Illinois, etc.	2,034	1,992	1,091
Oklahoma-Kansas	2,287	2,312	3,793
Texas Gulf Coast:			
Domestic	7,536	7,395	5,169
Foreign	281	306	610
Texas, rest of State	863	942	984
Louisiana-Gulf Coast:			
Domestic	7,519	8,241	3,348
Foreign	766	909	1,095
Louisiana-Arkansas	710	676	715
Rocky Mountain	1,487	1,394	1,449
U. S. east of Calif.	36,649	37,648	28,033

AT TANK FARMS IN PIPE LINES AND ELSEWHERE THAN REFINERIES

	Oct. 31 1926	*Sept.30 1926	†Oct.31 1925
Appalachian	6,666	6,842	6,819
Kentucky	1,163	1,271	1,706
Lima-Indiana	702	733	1,058
Illinois-S. W. Indiana	11,677	11,448	10,574
Okla.-Kans.-Texas except Gulf Coast	137,142	136,198	159,470
N. Louisiana-Arkansas	33,840	35,008	41,462
Gulf Coast	19,415	18,253	19,981
Rocky Mountain	29,297	29,833	28,563
Foreign:			
Atlantic ports	73	66	47
Gulf ports	536	471	480
Total east of Calif.	277,160	277,771	298,193
California:			
20° and lighter	30,467	30,489	44,059
Heavier than 20°	87,461	87,475	83,391
Grand Total	395,088	395,735	425,643

CLASSIFICATION BY GRAVITY

(Crude elsewhere than refineries east of Calif.)

24° and lighter	222,957	220,419	.....
Heavier than 24°	54,203	57,352	.....

*Revised. †Final figures.

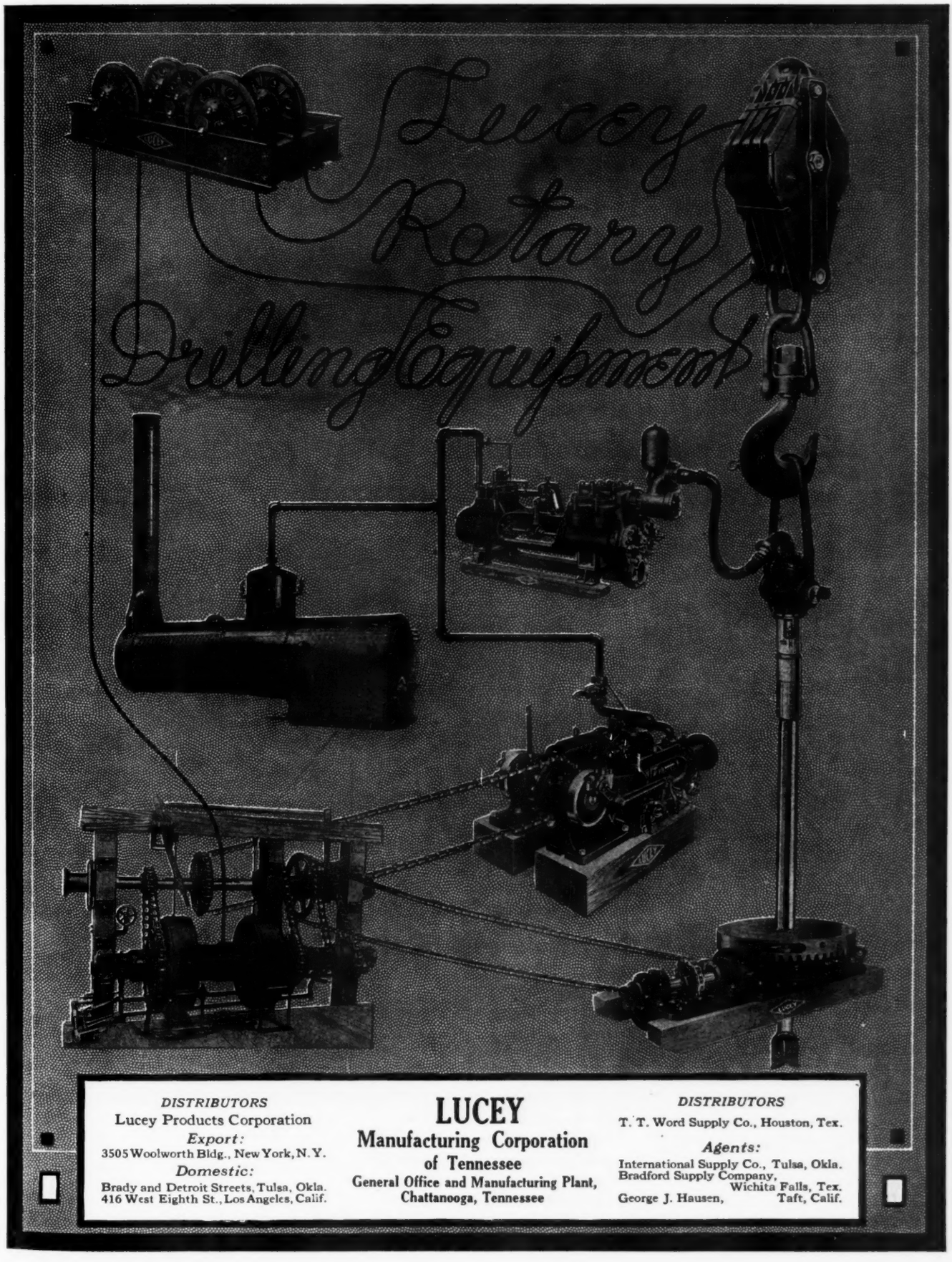
Crude Oil Situation By Fields—Barrels

Fields	Oct. Daily Average Production	*Sept. Daily Average Production	Jan.-Oct. Production 1926	†Jan.-Oct. Production 1925	Oct. Daily Average Deliveries	*Sept. Daily Average Deliveries	Jan.-Oct. 1926 Total Deliveries	†Jan.-Oct. 1925 Total Deliveries
Appalachian	80,400	82,000	23,779,000	23,138,000	89,500	93,100	24,443,000	23,894,000
Lima-Indiana	5,400	5,700	1,739,000	1,811,000	6,400	5,600	2,008,000	1,978,000
Michigan	400	300	51,000	.....	400	300	51,000	.....
Illinois-S. W. Indiana	22,700	23,800	7,058,000	7,134,000	15,300	23,800	5,963,000	7,439,000
Mid-Continent	1,254,700	1,202,700	342,328,000	357,206,000	1,261,900	1,232,500	367,287,000	367,493,000
Gulf Coast	154,400	160,500	33,819,000	27,765,000	117,000	128,700	33,667,000	27,946,000
Rocky Mountain	92,300	98,300	31,362,000	29,338,000	109,600	113,900	31,060,000	29,506,000
California	611,800	603,500	184,667,000	193,867,000	**612,967	**667,800	**196,722,000	**169,609,000
Total Domestic	2,222,100	2,176,800	624,803,000	640,269,000	‡2,213,067	‡2,265,700	‡661,201,000	‡627,865,000
Imports	124,500	145,000	50,353,000	52,692,000	.....	.....	.....	.....
Deliveries of Foreign Crude	.....	.....	.....	.....	122,200	144,700	50,150,000	52,692,000
Exports	.....	.....	.....	.....	32,600	46,000	12,780,000	11,718,000
Total New Supply	2,346,600	2,321,800	675,156,000	692,961,000	.....	.....	.....	.....

*Revised. †Final figures. **Includes Fuel Oil. ‡Includes Exports.

Gasoline Situation by Districts—Barrels

Districts	October Daily Avg. Output	September Daily Avg. Output	October Chge. %	October Daily Avg. Ship.	September Daily Avg. Ship.	October Chge. %	Stocks Oct. 31 1926	Stocks Sept. 30 1926	Stocks Oct. 31 1925
East Coast	130,032	122,433	+ 6.20	142,484	147,133	— 3.16	6,333,000	6,719,000	7,727,000
Appalachian	33,581	33,933	— 1.03	30,613	35,633	—14.09	716,000	624,000	725,000
Indiana-Illinois	111,645	114,300	— 2.32	109,065	125,333	—12.98	3,486,000	3,406,000	3,726,000
Oklahoma-Kansas	137,484	149,300	— 7.91	139,968	150,900	— 7.24	2,628,000	2,705,000	2,297,000
Texas	177,290	174,200	+ 1.77	163,065	162,933	+ 0.08	4,027,000	3,586,000	4,105,000
Louisiana-Arkansas	50,516	48,600	+ 3.94	41,065	56,900	—27.82	3,070,000	2,777,000	4,584,000
Rocky Mountain	47,516	46,933	+ 1.24	50,581	54,800	— 7.70	3,450,000	3,545,000	3,540,000
California	142,967	138,100	+ 3.52	142,419	134,500	+ 5.89	9,996,000	9,979,000	9,707,000
Total U. S.	831,032	827,800	+ 0.39	819,258	868,133	— 5.63	33,706,000	33,341,000	36,411,000
Texas Gulf Coast	139,935	137,000	+ 2.14	124,372	126,300	— 1.52	3,710,000	3,192,000	3,560,000
Louisiana Gulf Coast	38,065	35,167	+ 8.24	28,293	43,667	—35.21	3,007,000	2,696,000	4,484,000



DISTRIBUTORS
Lucey Products Corporation
Export:
3505 Woolworth Bldg., New York, N. Y.
Domestic:
Brady and Detroit Streets, Tulsa, Okla.
416 West Eighth St., Los Angeles, Calif.

LUCEY
Manufacturing Corporation
of Tennessee
General Office and Manufacturing Plant,
Chattanooga, Tennessee

DISTRIBUTORS
T. T. Word Supply Co., Houston, Tex.
Agents:
International Supply Co., Tulsa, Okla.
Bradford Supply Company,
Wichita Falls, Tex.
George J. Hausen, Taft, Calif.

Natural Gasoline and Motor Blends—Barrels

Districts	Daily Avg. Production Oct. (net)	Daily Avg. Production Sept. (net)	Stocks End of October	Stocks End of September	Motor Fuel Blends Made in Oct.	Motor Fuel Blends Made in Sept.	Stocks of Blends End of October	Stocks of Blends End of September
Appalachian	6,237	4,519	71,976	58,810	13,214	12,357	9,548	9,524
Indiana-Illinois, etc	1,099	1,070	7,643	7,881	2,429	2,000	619	643
Oklahoma-Kansas	34,200	33,343	213,214	241,952	†121,810	264,048	†21,619	47,833
Texas	16,532	15,549	115,929	117,310	† 16,905	29,929	† 1,762	4,619
Louisiana-Arkansas	5,000	5,004	34,190	26,095	3,667	5,881	4,762	10,143
Rocky Mountain	3,221	3,085	10,548	11,714	10,143	7,929	10,571	9,452
Total east of California	66,290	62,572	453,500	463,762	168,167	322,143	48,881	82,214
California	27,465	26,014	34,000	29,238	.....	.....	.....	.....
Total United States	93,755	88,586	487,500	493,000	.....	.....	* 48,881	* 82,214

*Exclusive of California. †Deleted by amounts transferred to refinery accounts.

Kerosene Situation by Districts—Barrels

Districts	October Daily Avg. Output	September Daily Avg. Output	October Chge. %	October Daily Avg. Ship.	September Daily Avg. Ship.	October Chge. %	Stocks Oct. 31 1926	Stocks Sept. 30 1926	Stocks Oct. 31 1925
East Coast	32,097	36,367	—11.74	32,097	31,700	+ 1.25	1,774,000	1,774,000	1,584,000
Appalachian	12,935	11,867	+ 9.00	12,355	11,167	+10.64	276,000	258,000	230,000
Indiana-Illinois	15,613	14,833	+ 5.25	12,097	15,033	—19.53	712,000	603,000	863,000
Oklahoma-Kansas	23,419	24,200	— 3.22	20,677	23,367	—11.51	472,000	387,000	405,000
Texas	38,806	43,433	—10.65	39,000	45,167	—13.65	1,913,000	1,919,000	2,422,000
Louisiana-Arkansas	16,518	17,900	— 7.36	17,613	22,200	—20.66	1,417,000	1,449,000	549,000
Rocky Mountain	6,516	6,400	+ 1.81	6,839	7,300	— 6.31	241,000	251,000	277,000
California	18,613	18,033	+ 3.21	21,355	18,000	+18.64	1,433,000	1,518,000	1,646,000
Total U. S.	164,580	173,033	— 4.88	162,032	173,933	— 6.84	8,238,000	8,159,000	7,976,000
Texas Gulf Coast	31,000	35,533	—12.75	34,935	39,600	—11.78	1,446,000	1,568,000	2,194,000
Louisiana Gulf Coast	14,968	16,400	— 8.73	16,097	20,267	—20.57	1,403,000	1,438,000	543,000

Lubricants Situation by Districts—Barrels

Districts	October Daily Avg. Output	September Daily Avg. Output	October Chge. %	October Daily Avg. Ship.	September Daily Avg. Ship.	October Chge. %	Stocks Oct. 31 1926	Stocks Sept. 30 1926	Stocks Oct. 31 1925
East Coast	25,613	25,367	+ 0.97	20,032	27,733	—27.76	2,660,000	2,487,000	2,468,000
Appalachian	12,935	13,500	— 4.18	12,323	12,366	— 0.34	995,000	976,000	850,000
Indiana-Illinois	9,097	8,833	+ 2.98	7,677	9,267	—17.15	658,000	614,000	705,000
Oklahoma-Kansas	6,484	6,900	— 6.02	6,968	6,000	+16.13	389,000	404,000	376,000
Texas	22,710	22,867	— 0.69	21,065	21,967	— 4.10	1,636,000	1,585,000	1,325,000
Louisiana-Arkansas	2,548	1,600	+59.25	2,226	1,800	+23.66	107,000	97,000	118,000
Rocky Mountain	1,548	1,567	— 1.21	1,548	1,733	—10.67	161,000	161,000	130,000
California	8,355	7,533	+10.91	8,161	9,867	—17.28	831,000	825,000	851,000
Total U. S.	89,290	88,166	+ 1.27	80,000	90,733	—11.82	7,437,000	7,149,000	6,823,000
Texas Gulf Coast	21,548	21,933	— 1.75	19,935	20,700	— 3.69	1,603,000	1,553,000	1,291,000
Louisiana Gulf Coast	2,419	1,567	+54.37	2,129	1,733	+22.85	105,000	96,000	119,000

Gas and Fuel Oils—Situation by Districts—Barrels

Districts	October Daily Avg. Output	September Daily Avg. Output	October Chge. %	October Daily Avg. Ship.	September Daily Avg. Ship.	October Chge. %	Stocks Oct. 31 1926	Stocks Sept. 30 1926	Stocks Oct. 31 1925
East Coast	185,194	161,600	+14.60	221,194	162,867	+27.95	5,831,000	6,947,000	6,889,000
Appalachian	21,645	19,100	+13.32	21,419	19,367	+10.60	692,000	685,000	730,000
Indiana-Illinois	54,129	55,267	— 2.06	55,290	58,567	— 5.60	1,391,000	1,427,000	1,383,000
Oklahoma-Kansas	87,355	93,133	— 6.20	81,774	87,700	— 6.75	5,583,000	5,410,000	4,860,000
Texas	190,000	168,833	+12.54	187,452	151,667	+23.59	8,674,000	8,595,000	8,615,000
Louisiana-Arkansas	98,742	98,533	+ 0.21	97,032	91,300	+ 6.27	2,743,000	2,690,000	4,759,000
Rocky Mountain	28,290	22,633	+24.99	27,774	24,300	+14.29	1,462,000	1,446,000	1,712,000
California	378,581	401,567	— 5.72	.....	.....	.....	.....	.....	.....
Total U. S.	1,043,935	1,020,667	+ 2.27	*691,935	*595,766	+16.14	*26,376,000	*27,200,000	*28,948,000
Texas Gulf Coast	146,548	127,600	+14.85	134,935	115,167	+17.16	7,736,000	7,376,000	7,295,000
Louisiana-Gulf Coast	55,419	48,833	+13.48	53,484	43,700	+22.38	1,956,000	1,896,000	3,991,000

*East of California only.

Daily Average Runs to Stills—All Oils—Barrels

	East Coast	Appala.	Ind.-Ill.	Okla.-Kans.	Texas	La.-Ark.	Rocky Mt.	Calif.	Total U.S.
January, 1926	334,742	73,516	185,709	261,903	426,129	196,484	87,548	558,097	2,120,900
February	360,036	78,428	192,964	256,857	434,674	200,357	96,250	549,821	2,169,400
March	369,032	74,677	187,419	250,742	422,774	203,839	98,355	563,228	2,176,500
April	365,400	77,133	203,033	266,000	451,667	205,867	98,733	557,900	2,225,200
May	373,516	81,677	211,065	293,903	431,451	199,161	101,322	588,613	2,280,700
June	382,800	85,433	211,467	293,267	446,867	207,433	107,033	574,033	2,308,300
July	418,742	83,097	210,193	292,645	448,516	206,839	102,355	575,193	2,337,600
August	395,935	87,613	208,677	300,484	446,484	211,129	106,903	599,645	2,356,900
September	404,600	86,667	212,300	300,167	452,900	213,000	109,333	607,867	2,386,833
October	427,935	87,645	208,710	279,645	482,935	210,612	113,323	587,645	2,398,500

Coke, Asphalt, Miscellaneous Products

	Coke Output (Tons)	Coke Stocks (Tons)	Asphalt Output (Tons)	Asphalt Stocks (Tons)	Miscel. Products Output (Bbls.)	Miscel. Products Stocks (Bbls.)	Unfin. Oil Output (Bbls.)	Unfin. Oil Stocks (Bbls.)	Losses (Bbls.)
January, 1926	73,701	230,566	162,383	174,564	491,652	1,063,619	2,097,000	37,880,000	1,995,000
February	64,105	210,247	152,468	182,063	481,428	1,073,238	2,340,500	38,808,000	1,767,000
March	80,689	219,820	210,596	195,052	597,810	1,217,119	2,195,928	39,098,000	2,059,000
April	76,031	216,163	198,598	239,953	572,381	1,138,095	2,481,952	38,785,000	1,982,000
May	79,982	234,025	248,390	229,819	779,310	1,210,428	2,756,024	38,681,000	2,270,000
June	81,326	246,707	300,970	200,881	784,476	1,010,381	2,767,000	40,081,000	2,308,000
July	83,358	260,727	281,196	184,853	800,310	897,452	2,927,214	38,527,000	2,419,000
August	89,100	277,668	305,944	200,175	733,000	858,000	2,848,000	39,822,000	2,605,030
September	95,111	287,546	308,572	188,512	749,000	835,000	2,721,000	39,500,000	2,492,000
October	87,946	287,354	323,348	187,845	738,000	863,000	2,790,000	40,006,000	2,487,000

(Continued from page 76)

and Oklahoma-Kansas districts but increased in every other district in October as compared with September. Texas and California districts were the only ones to report larger daily average shipments in October, and the gain in Texas was trivial. Atlantic Coast, Oklahoma-Kansas and Rocky Mountain districts reduced gasoline stocks.

Kerosene

KEROSENE daily average production was increased in the Appalachian, Indiana-Illinois, Rocky Mountain and California districts in October over September. Daily average shipments were larger in only the Atlantic Coast, Appalachian and California districts. Texas, Louisiana-Arkansas, Rocky Mountain and California districts reduced their kerosene stocks in October.

Lubricants

LUBRICATING oil production was increased in the Atlantic Coast, Indiana-Illinois, Louisiana-Arkansas, and California districts. In all but the Arkansas-Louisiana and Oklahoma-Kansas districts daily average shipments were less in October than in September. For all of the United States daily average output was 1.27 per cent more than in September but shipments were 11.82 per cent less.

Fuel and Gas Oils

DAILY average fuel and gas oil output was increased 2.27 per cent for the whole country and average shipments were 16.14 per cent larger east of California although shipments were less than in September from the Indiana-Illinois and Oklahoma-Kansas districts.

Natural Gasoline

DAILY average natural gasoline output was larger in October than in September in every district except Louisiana-Arkansas where production was stationary. Stocks were increased in the California, Appalachian and Louisiana-Arkansas districts but reduced elsewhere.

BRIGHTON, COLO.—Rogers Oil Co. has completed a modern brick and stucco drive-in service station here, with bulk storage underground. White Eagle products are handled. W. H. Rogers, owner, is erecting a residence next to the station. Last spring Mr. Rogers sold his bulk plant and service station at Iola, Kan., to the Lesh Oil Co., Ottawa, Kan.

MOHALL, S. D.—Ronning Independent Oil Service, of which Olaf J. Ronning, Mohall, is proprietor, has completed a bulk station of 39,000 gallons capacity, at Landa, N. D. The station is reported to be doing good business with Pure Oil products. Pumps have been installed at Somis, Roth, Landa and Westhope.

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RED AND PALE PARAFFINE OILS

S. O. Gives Natatorium To Refinery Town

Staff Special

CHICAGO, Dec. 10.—As the indirect gift to its many employees living in Wood River, Ill., Standard Oil Co. of Indiana recently gave the city of Wood River a swimming pool and recreation center costing $100,000 with a special provision for the establishment to be maintained by the city. It has proven a source of great pleasure to the inhabitants of Wood River, according to George Cook, head of the department of public relations of the Standard.

Wood River, being an inland town without adequate swimming facilities and without suitable social headquarters, specified popular what sort of gift it preferred. The community house is small as compared with the swimming pool. It is big enough to hold a dance or other social gathering, but the greater share of the gift was the natatorium, 300x200 feet containing 1,320,000 gallons of water, warm winter and summer, filtered pure and softened with water softeners provided by the Graver Corp., East Chicago, Ind.

The establishment is equipped with all manner of modern bath-house equipment. There are comfortable dressing rooms, steel lockers for clothing, showers to be used by patrons before entering the pool and, in fact, everything that a modern bathing beach embodies. The community share of the work was promoted by A. J. Parkin who distinguished himself during the World War in "Community Service," then known as War Camp Community Service. A recent issue of Stanolind Record reported there were 15,000 persons present at the formal opening in which all Wood River social and civic organizations took part.

Gasoline Plant for Seal Beach

LOS ANGELES, Dec. 11.—The Richfield Oil Co. has awarded contract to J. A. Campbell for the erection of a natural gasoline plant at Seal Beach. The plant will have a rated capacity of 10,000 gallons daily, and to start with will consist of one Campbell absorber. This plant is a duplicate of the plant erected by Campbell for Richfield at Huntington Beach, which has been making 14,000 gallons daily. A compressor will not be installed at first, as the plant will use the casing pressure. There are two portable plants now operating at Seal Beach, where there is a total production of close to 4,000,000 cubic feet of gas daily.

ADA, OKLA.—The Texas Co. recently opened for business its new service station here. Its bulk plant here has been rebuilt and modernized.

The company recently purchased a filling station in Henryetta, Okla., which has been repaired and brought up to The Texas Co.'s specifications. It was opened on Nov. 20.

The Holmes-Manley *Cracking* Process

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17 Battery Place, New York, N. Y.

Physician Drives 110 Miles to Get Thorough Motor Car Lubrication

By Roger B. Stafford
N. P. N. Staff Writer

DAYTON, O., Dec. 11

ABOUT every two weeks a car bearing the wand of Mercury and a Cincinnati name plate is driven into the W. 3rd St. station of the Indian Refining Co. here to be oiled and greased. The car is owned by a Cincinnati physician who takes a half holiday every 1000 miles to drive 55 miles to Dayton the nearest point where he can get the Indian's Motor-n-All lubrication service. Paul C. Conder, the Indian's district manager for the Dayton territory which includes a large part of Ohio, will attest to this practice of this Cincinnati doctor.

The physician knows that the automobile is not a great deal different from man. The inner workings must be in good shape and well lubricated if they are to function properly. The physician's education and training have taught him to be thorough and he wishes that the care of his automobile shall be as thorough as is his care of his patients.

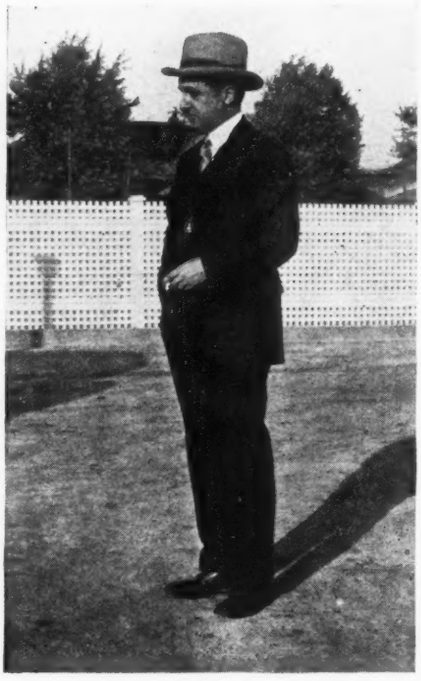
The physician has been convinced that the Motor-n-All service measures up to his idea of thoroughness so he is willing to devote part of an afternoon and evening and drive at least 110 miles to have his oiling and greasing done in a manner that is satisfactory to him.

Attendant Specially Trained

THE man who is in charge of the service has been specially trained. Like other Motor-n-All attendants of the Indian Refining Co. in the middle western states where the company operates he has spent a week at the Alemite factory. He also has spent a week at an Indian station in another city where Motor-n-All service is sold. During his training he was paid a salary and expenses.

When a car is to receive Motor-n-All service it usually is driven on the rotary lift which is always part of the equipment. Sometimes when a greasing station is rushed the car is driven over a drain pit for part of the work but the chassis, transmission and differential work is always done on the lift. The customer likes to see the car in the air, Mr. Conder said.

The attendant first removes the hub caps one at a time and fills them with grease. The crankcase is then drained, flushed with a paraffin oil and refilled. The grease in the differential and transmission cases is brought to the proper level. One pound of grease goes with the service but if more than a pound is needed the car owner must pay extra for the quantity used. The universal joints are filled with grease and clutches oiled on cars having oil clutches.



Paul C. Conder, district manager, Indian Refining Co. at Dayton, O., looks over a Motor-n-All job being done

Brakes Protected from Oil

THE car is then run on the lift if the preliminary work has been done over a pit. It is lifted off the springs and these are sprayed with a paraffin oil. The wheels are covered with canvas during the spraying so they will not be soiled with oil, and that no oil will get on the brake linings.

The Motor-n-All attendant then circles the car greasing every fitting. He knows where all fittings are placed on all cars. He has learned that in his special training. The grease is put in under 2000 pounds' pressure with a gun that may be stepped up to 10,000 pounds' pressure. The attendant is careful to see that grease comes through the entire place it is to lubricate. In the case of obstinate bearings, the attendant takes a pinch bar and rocks the car sufficiently to permit the passage of the grease. Rocking is often necessary with cars that have been neglected by their owners.

The attendant then goes over the car with an air gun for places where there are no grease fittings but where squeaks develop. The fan hub is oiled as are the steering assembly, door hinges and lock tongues. Bolts are tightened and if the attendant notices that some part of the car needs mechanical attention he makes a note of what is needed and gives it to the owner.

If the attendant for some reason has to lean over the car, he puts a canvas over it so the finish will not be soiled. If he has to get inside the car, as in turning over the motor in flushing the crankcase, he puts clean canvas over the upholstery and a piece of canvas on the floor so the interior will remain as clean as when the owner left it to be lubricated.

Making the Service Handy

THE Indian has several service stations in Dayton but Motor-n-All service at only one. That fact does not force a car owner to drive to the Motor-n-All station which is about two miles from the center of the business district. He may leave his car at any Indian station, tell the attendant when he wishes to get it and go on about his business.

The service station salesman calls the Motor-n-All station, an attendant from it puts on a long clean coat and drives to the station where the car was left. He leaves his own car, takes the customer's car to the Motor-n-All station, puts on a working coat or jumpers, does the lubricating job, puts the clean coat on again, drives the customer's car to the station where he got it, and returns to his own station in his own car. The coat he wears in his customer's car is used only in customers' cars so there is no chance of the upholstery becoming discolored while the car is in the Indian's charge. Also the car owner may call the Indian and have its men get the car anywhere in the city.

Cars Are Insured

NOT only is precaution taken against soiling a customer's car, but the customer's car is insured against any kind of accident, damage or other liability. The cost of this insurance varies, Mr. Conder said, depending on the number of accidents the company may have with customers' cars. But accidents, all minor, have been so rare that the protection to the company requires only a very small annual expenditure, he said.

The charges for Motor-n-All service ranges from $1.75 for a Ford to $4.25 for a Cadillac or any car in the latter's class. The charge for an Essex is $2.75. Chevrolet, Buick, Chrysler, or Hudson $3.50 and Jordan $4. Factors entering into price variances are capacity of

Union Metal Ornament Filling Station, Designed R-225, installed at Garrett, Indiana.

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Car on Rotary lift at Indian Refinery Co. station, Dayton, O., receiving Motor-n-All service

crankcase, number and placing of fittings, and probable time required to go over a car thoroughly.

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Four Men at Stations

THERE are four men employed at Indian stations in this district in addition to the Motor-n-All service man and his assistant. These are two station salesmen and their assistants. A salesman and an assistant work from 11 a.m. to 10 p.m. one day and from 6:30 to 11 a.m. the following day. The other shift takes up the work at 11 a.m. and works through to closing time and opens the station the next day, working until 11 o'clock. An inventory of the station's merchandise is taken at 11 a.m. each day and shifts are arranged so that the station will be in charge of only one crew for 24 consecutive hours. Responsibility is placed upon the salesman for all merchandise and cash receipts. He handles all the money and he only shares in the bonuses granted for sales in excess of a station's quota.

Salesmen are invoiced at the end of each month for any losses or discrepancies shown between stocks and receipts at their stations. If the differences are reasonable or normal the invoices are destroyed by the district manager, but if they are excessive, the salesman must make them good or lose his job. The maximum outage for gasoline is one gallon in 200. That volume must take care of handling losses incurred in making the daily tests of pumps, or spillage.

Indian, Mr. Conder said, figures one gallon of motor oil should be sold for every 25 gallons of gasoline where there is Motor-n-All service. The bonus for salesmen is 5 cents a gallon on oil up to the quota and a small extra commission on both gasoline and oil above the quota. Quotas and commissions vary.

Skelly Starts Issuing New House Organ

TULSA, Dec. 9.—"Skelly News," a new house organ issued by the Skelly Oil Co., has made its appearance, with the November issue. Glenn Condon is editor and J. Baxter Gardner associate editor.

The magazine contains 40 pages. The cover carries a picture of the Skelly Oil Co.'s Country club plaza station, Kansas City, Mo. On the inside front cover is a full length picture of Miss Norma Smallwood of Tulsa, "Miss America for 1926." Articles in the magazine refer to a recent inspection trip of the Mid-Continent oil fields by eastern bankers and oil men as guests of W. G. Skelly, president of the company; the history of natural gasoline, the company's activities in the Texas Panhandle; the company's radio activities, in addition to articles of interest to Skelly employes. The magazine is profusely illustrated. A full page of pictures is carried with the heading "Kansas City Service."

On the inside back cover is the Skelly Oil Co. "Creed" which can be found in any of the Skelly stations.

DUCAN, OKLA.—Rock Island Oil Co., with headquarters here, has completed a bulk station at Hobart, Okla. with H. F. Kuhlmanas agent. The station opened for business on Nov. 15.

Relationship of Geology to Development Of Rocky Mountain Oil Fields

By Ralph Arnold
Geologist

Read Before Second Annual Convention, Montana Chapter, Rocky Mountain Oil and Gas Association, Great Falls, Mont., Dec. 3

INTRODUCTION

THIS paper will be concerned in a general way with the personal experiences of the writer and his associates in the oil development of the Rocky Mountain fields. The reasons for making this largely a personal narrative are two-fold. First, it is hoped that others may profit from it by the mistakes which the writer has made in the past and, second, he hopes to point the way to further development wherein all of us may reap some of the benefit.

* * *

My initiation into the Wyoming oil fields was in connection with Cassius A. Fisher and W. R. Calvert, who then were my partners. They were familiar with Rocky Mountain conditions, while my experience had been confined to the California oil fields. One of our first moves was to try out a California theory in the Rocky Mountains. But it did not work. To be specific we drilled some wells in a monocline near wonderful outcrops of oil sand, only to find water down the dips from the outcrops. And to this day, so far as the writer is aware, no monoclinal fields have been developed in the Rocky Mountains, although similar structural conditions in California yield abundant oil. The difference is probably to be accounted for in the character of the oil, that in California being largely asphaltic, which lends itself to sealing the outcrops, while that in Wyoming is mainly of paraffine base, which does not act as a sealing agent.

About the time (1910) we were drilling water wells in the monoclines, some other Californians were drilling oil wells in the Salt Creek field near Casper. Small wells had been producing for some time from the plunging north nose of the great structure at Shannon, but it took the Californians to open up the main part of the dome. This territory looked good to us so Fisher took some Colorado Springs men in to see the field. They were impressed, bought 80 acres of patented land, and this was the beginning of the Midwest Oil Co. Shortly after that Fisher and I dissolved partnership but we both continued to hunt domes instead of monoclines.

SCOUTING in the Big Horn Basin I was shown the Grass Creek and Buffalo Basin domes. Buffalo Basin looked the best but Grass Creek was nearer the railroad. To prove that a geologist is sometimes practical, the first well was located in Grass Creek. It came in a producer, brought a rush to the field and my group found itself in conflict with Fisher's Midwest crowd. Gun men and general all around tough hombres were lined up on both sides but fortunately no shots were fired and a compromise was effected. Both sides reasoned it was better to enjoy the benefit of half a dome than to leave a whole dome for their residuary legatees to fight over.

Later, Buffalo Basin was thoroughly prospected but only gas was encountered. As previously stated this looked better geologically than Grass Creek—which goes to show that the drill is the only reliable arbiter. Had Buffalo Basin been drilled first and condemned, Grass Creek would doubtless have remained untested for years.

A little later a government report came out, showing a structure near Big Muddy, east of Casper. All of the Rocky Mountain geologists and operators who looked at the map said the dips were too low to permit of oil accumulation in commercial quantities. I looked over the map, concluded I had made so many mistakes already that one more or less would make no difference, and boldly recommended the structure for a test. The well was drilled by a rank outsider, A. E. Humphrey, of Colorado, under the advice of Julius Fohs, and another field opened up. Incidentally it proved that domes with low dips could produce, and it also disclosed a new producing horizon, now known as the Big Muddy Sand. And so with each additional development something new was learned regarding the occurrence of oil in Wyoming. The Big Muddy discovery stimulated exploration which resulted in the opening up of several other pools in the northeastern part of the state.

Oil Possibilities in Montana

IT IS my belief that the oil history of Montana lies in the future, rather than in the past. This in spite of the fact that only five commercial fields have resulted from the drilling of more than 170 wild cat wells. My analysis of the situation is this:

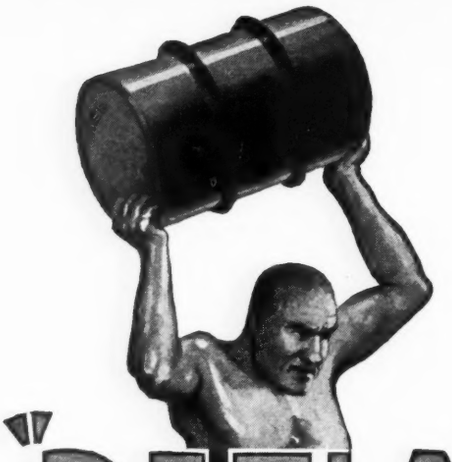
Most of the wells so far drilled in Montana were put down with the advice of geologists largely trained in Wyoming geology or by operators coming from the same region. Hence Wyoming criteria have been used in locating most of these test wells. Although Wyoming conditions may approximate in the southern part of Montana, I question their application in the rest of the state. The great ice sheet lay over most of Montana countless ages after it had melted away in Wyoming. As a consequence post-glacial erosion advanced much farther in Wyoming than in Montana. One direct result of this has been that the centers of the anticlinal folds and domes of Wyoming have been eroded out while the crests of many structures in northern Montana are still reflected in the topography.

Wyoming geologists have been prone to locate anticlines in Montana stream valleys having flanking escarpments, because in Wyoming many stream valleys follow anticlinal axes, with flanking escarpments indicating beds dipping away from the drainage lines. In northern Montana, especially on the Sweet Grass arch, the streams may flow in synclines. Only by such an interpretation can I account for the number of wild cat wells which have been drilled entirely off structure. Again, most of the oil-bearing horizons of Wyoming are found above the base of Cretaceous.

Premature Abandonments

AS a result when a Wyoming man operating in Montana reached the base of the Cretaceous without encountering oil, he generally abandoned the hole fully convinced he had thoroughly tested the spot. It becomes more and more certain as developments progress that the oil, at least in northern Montana, has its ultimate source in the Devonian and Carboniferous. Hence any operation that does not include a test of the Devonian cannot be said to be conclusive.

Furthermore it seems probable that faulting has a profound effect on migration and accumulation in this region. How else could oil escape from such impervious rocks as fine shales and compact limestones except through a fracturing of the rock either naturally by faulting or sharp folding or artificially through shooting. Hence those parts of good looking structures not affected by faulting may be barren, while other portions adjacent to fracture zones may be highly productive. The Cat Creek



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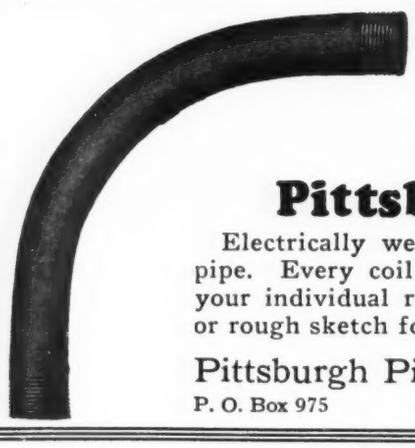

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field and certain parts of the Kevin-Sunburst field clearly prove this.

After a study of the so-called failures in Montana I conclude that many of these wells have not been properly located on structures, that others have missed fracture zones in the favorable structures and that most of them have not attained the lower formations where experience is teaching us we may best expect commercial yield of oil. Please remember that I am not criticising those who have drilled these wells, for each and every one has doubtless done his best in view of the information that was available to him. Furthermore, each hole, be it wet or dry, has contributed to our knowledge of the country, and each operator who has thus made our task easier should be given his due share of credit, for the results we obtain. It is easy for us, who come along after the pioneers have drilled all of these wells, to tell why they were not successful. If we can use the information these operations yielded to avoid more dry holes, we will be doing remarkably well.

Resume of Conditions

TO summarize the lessons so far learned from the development along the Rocky Mountain front, we find:

First, that the oil in Alberta and northern Montana originates largely in the Devonian and Carboniferous limestones and shales, much of it remaining in these formations, but some of it, (and locally, as in the Tar Sand region, most of it,) migrating to overlying porous zones. Fracture and fault zones doubtless play a dominant part in the migration, while anticlinal and domal structures govern the accumulation of the migrated oil as well as the oil in the formations of origin, especially as regards commercial deposits. Gas is prevalent in nearly all favorable structural positions, but does not necessarily indicate oil, as gas is more itinerant than oil and collects in appreciable quantities in structures where the geologic conditions have not developed to a point favorable to the accumulation of oil.

Second, that the oil in southern Montana and Wyoming and part of Colorado occurs at two different horizons, the lower, Paleozoic (mostly Carboniferous) and the upper, Cretaceous; that it consists of two different types, the lower heavy and asphaltic, the upper light and of paraffine base.

It seems likely that the limestones of the Paleozoic and the shales of the post-Paleozoic both may contribute to the origin of the oil. Folds such as anticlines and domes seem to play the dominant role in the migration and accumulation of the oil and gas, though here, as farther north, future study may indicate the influence of faulting and fracturing on migration and accumulation. Such commercial deposits as those in the shale area of the Salt Creek field of Wyoming and the Florence and Boulder fields of Colorado are clearly governed by fracture and fault zones.

Return bends for the high pressures and temperatures of cracking stills

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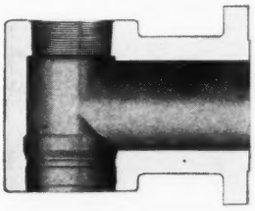
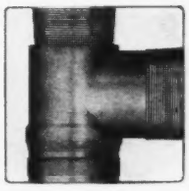
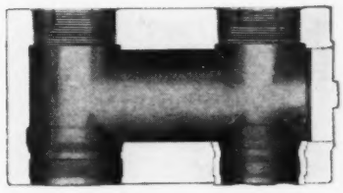


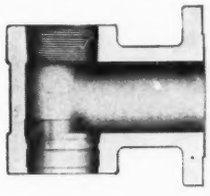
Forged steel half bend. Flanged end, with solid clean-out plug. Grooved for rolling in tubes for 5-inch U. P. O. Co. Dubbs stills.



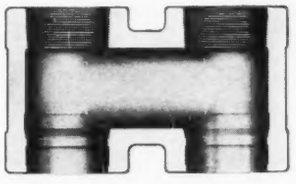
Forged steel half bend. Screwed end, with solid clean-out plug. Grooved for rolling in tubes for 5-inch U. P. O. Co. Dubbs stills.



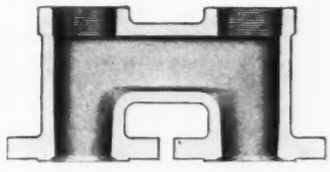
Forged steel return bend. Screwed end, with solid clean-out plug. Grooved for rolling in tubes for 5-inch U. P. O. Co. Dubbs stills.



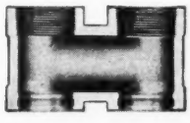
Cast steel half return bend. Flanged end, with solid clean-out plug. Grooved for rolling in 4-inch tubes.



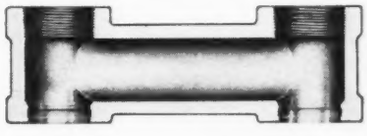
Cast steel return bend. Screwed end, with solid clean-out plug. Grooved for rolling in 4-inch tubes.



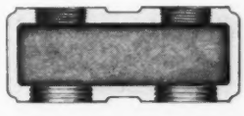
Cast steel return bend. Flanged end faced for ground joint with tubes. Solid clean-out plug.



Cast steel return bend. Screwed end, with solid clean-out plug. Grooved for rolling in tubes.



Wide center cast steel return bend. Screwed end, with solid clean-out plug. Grooved for rolling in tubes. For special cracking still construction.



Cast steel box bend. Screwed end. Grooved for rolling in tubes, with solid clean-out plug. For low pressures and high temperatures.

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Individual Compressors for Each Well Are Part of Gas Lift System

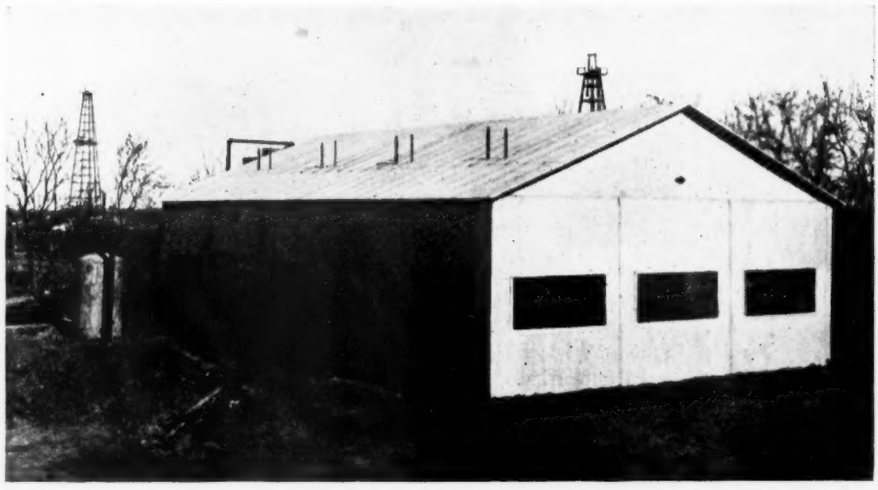
By Lawrence E. Smith
N. P. N. Staff Writer

TULSA, Dec. 13

GAS lift, which is quite the rage now in Mid-Continent producing circles, is today highly important in the operation of Roxana Petroleum Corp. properties in the south Udall field of Kansas, located on the Cowley-Sumner county line.

The company has set up a closed cycle system of taking gas off gas-oil separators, passing it through an absorption type gasoline plant, compressing the residue gas from the plant and returning it to the oil wells where, introduced between the casing and tubing, it flows the production through the tubing.

The field under discussion is northeast of Oxford, Kans., and of the Rainbow Bend pool. It is a development of 1926, the first well having been brought in early in the summer. Production is found in a sand the identity of which is still under discussion. Average depth to the top of the sand is around 1830 feet and the pay zone at around 1860 feet.



Gas lift building of Roxana Petroleum Corp. in South Udall field, Kansas. Scrubber tank at left of building

Sand 30 Feet Thick

THE pay, averaging about 30 feet thick, is a fairly tight formation. Wells that have been drilled by the Roxana, Wentz Oil, Vickers Petroleum, Amerada Petroleum, have had initial productions of not more than 500 barrels, natural. After shot they swab 1000 to 1200 barrels in 24 hours. The best ones flow for three or four hours after the swab is run. Only one well has flowed before shot.

Obviously, from such performances, there is little gas pressure to move the oil. It was a choice between installing some form of pumping equipment, swabbing the production or putting in gas lift. Less oil a day would be recovered by pumping. Comparison of costs between swabbing and gas lift led to installation of the latter.

Casing practice in this field is to set 8-inch at about 1600 feet and to land the 6⅝ on the top of the sand. The wells fill up 700 to 1200 feet in fluid when drilled in and they maintain a fairly uniform column of fluid for a long time.

Gas lift was first applied to No. 1 Rutter well in August. At that time the well was swabbing about 800 barrels. Its production jumped more than 100 per cent in the first 24 hours that the gas lift was used and at this time (Dec. 1) is making around 1300 barrels per day. Performance of other wells in the field has been almost as satisfying as this.

Because of the greater ease of handling the gas through the gasoline plant when it is delivered steadily and at as nearly a uniform pressure as can be held, it was decided to install a compressor unit for each well. These are, however, centrally located and one building now houses seven of the Chicago Pneumatic straight line, two-stage, 4¼ by 10 units, capable of compressing to 1000 pounds and with delivery capacity of 240,000 or more cubic feet of gas daily at the usual working pressures in this field about 150 pounds.

Beginning at the well, equipment for gas lift consists simply of bradenhead connection, tubing and separator. Tubing is varied to suit the requirements of each well, being usually 3 or 4-inch. Tubing is suspended in the hole through most of the column of fluid and, as precaution, anchor clamps are used. No foot-piece is used, such as is common practice in California where gas lifts are common.

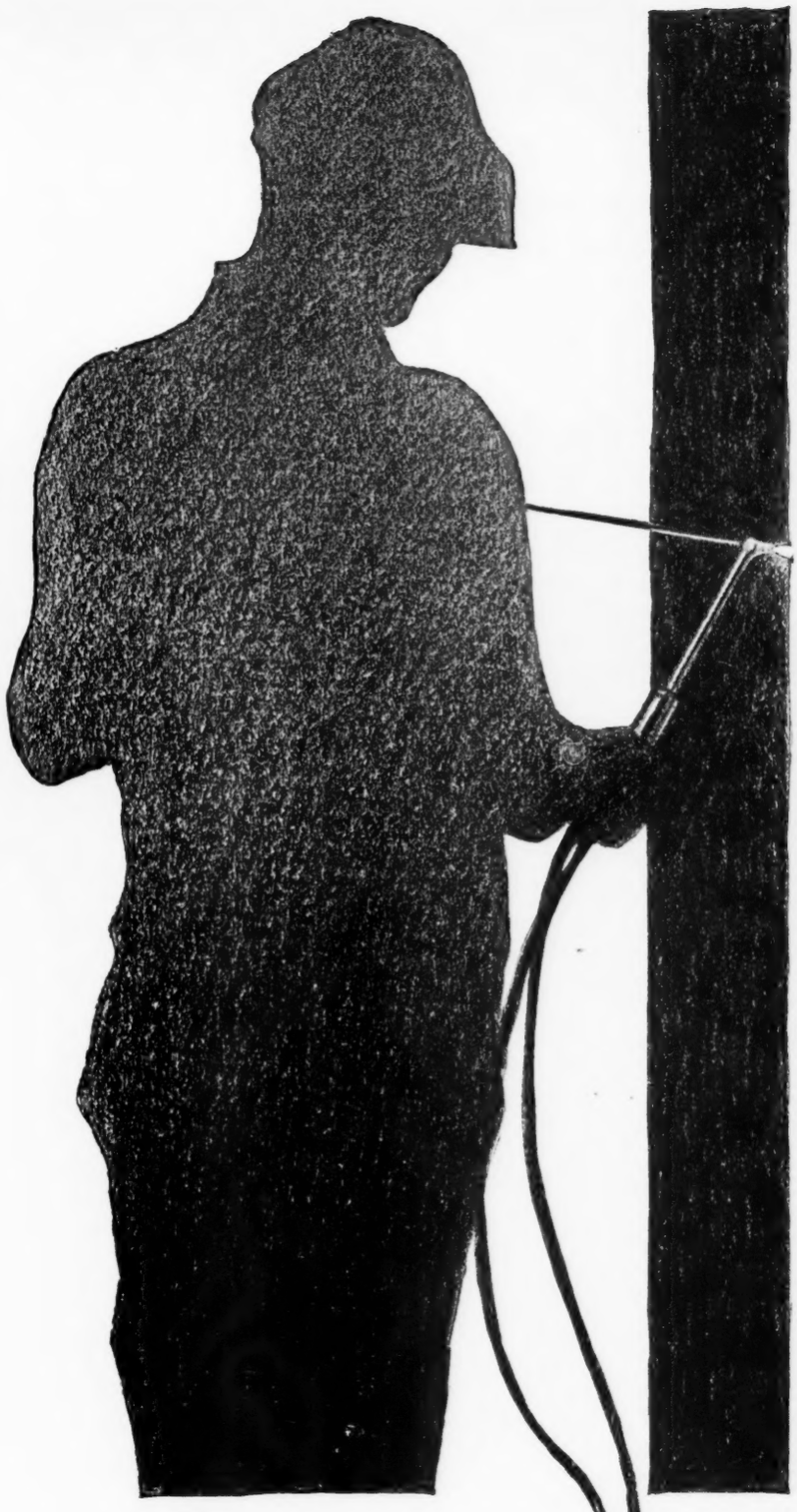
At the well one departure from the hook-up used in many fields has been made. This is with respect to location of the separators. Following the recommendation made by S. F. Shaw, San Antonio, an authority on air and gas lifts, the separators are set close to the well, reducing thereby the force necessary to flow the well. Separators used by the Roxana in this field are Trumble type. They are set 10 to 15 feet from the well head. Flow lines are equipped with bye-pass so that in case the separator requires attention, the well can be flowed directly into lease storage.

Gas lines from the separators are 4-inch and these lead into the main gas gathering lines, which are 6- and 8-inch. These big lines connect with two 80 h. p. Clark engine-compressors which give the pressure necessary to put the gas through the absorption gasoline plant and deliver the residue gas to the gas lift plant. The gasoline plant, which is of the semi-portable type capable of handling 3,000,000 feet of gas daily, is a quarter mile from the gas-lift plant.

At the gas-lift plant, the residue gas from the gasoline plant passes through a scrubber tank and into a header from which the seven units pick it up. When a new well has been added to those flowed by gas it has been the practice to start off at about 500 pounds pressure to give it the initial boost. After this the pressure is cut down to around 150 pounds. This is not an exact rule, for like a number of other phases of the system, trial and error method plays some part. No tests have been made by the Roxana in this field as to the pressure on the sand but a workable approximation is made in each well by ascertaining the height of the fluid column, the gravity of the oil and determining the weight of the column in comparison with an equal column of water. This affords, for practical purposes and within close enough limits, an idea of the pressure on the sand that lifts the column to that height and enables the operator to keep the pressure of the introduced gas below the sand pressure.

The Roxana has not yet made any determination of the ratio of gas to oil produced, but meters are now being installed at the wells for this purpose. There is, of course, an excess of gas coming from the wells over that put back in as a certain quantity is re-

(Cont'd on page 96)



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Our Industry—A Page of Facts and Observations

National Petroleum News

By Paul Wagner

THE vast Laredo district, second only to the West Texas wildcat area in being one of the "great open spaces" of the southwest, is now getting a lot of testing for oil at locations remote from production. Testing is now being carried as far afield as Starr county, where some four or five scattered operations are under way; and Zapata county also is getting increased attention.

The Milham Corp., with which the John Hays Hammond interests are connected, is drilling in the E. A. Noble survey, Starr county; Maddox and others are testing a block originally taken up by Jack Danciger et al, in the northeastern part of the county; J. K. Kepley is drilling northwest of Rio Grande City for the Pearson interests of Corpus Christi; and McCarley et al of San Antonio have started up on their Garcia test in survey 918. The deepest test in Zapata county is the No. 3 of The Texas Co., drilling below 4900 feet in the old Jennings gas field; Duke et al are on a second hole in the old Charco Redondo shallow territory; and Earl K. Bateman, formerly of Tampico, is going ahead in survey 617 below 2500 feet.

* * *

THE oil industry will learn with a measure of interest of the recent sale of the Bartlett ranch in northern New Mexico to a Delaware corporation known as the Vermejo Club. Among others this corporation includes as stockholders Harry Chandler, publisher of the Los Angeles Times and a large oil royalty owner; Cecil B. DeMille and Jesse L. Lasky, motion picture producers. The property, which is also known as the Vermejo ranch and which includes about 330,000 acres, sold for $1,500,000, two-thirds of which was paid in cash. Union Oil Co. of California within the last two years drilled on the ranch for oil, but failed to get production. The ranch is located along the Rocky Mountain front in New Mexico and is not without future oil possibilities, even though test operations are of rank wildcat classification.

* * *

WILDCATTING in the Laredo district may now proceed with the assurance that any important oil find over and above present production of about 16,000 barrels daily will get a reasonably quick outlet into the Texas crude markets. Until the present year the region was virtually hemmed in because of a lack of trunk line transportation facilities. Now the Humble Pipeline Co. has a system which extends from eastern Webb county to Corpus Christi, with gathering lines throughout the producing area; and the Magnolia Petroleum Co. has a pipeline at the completion stage from the producing area to Luling, where it connects with existing facilities to Beaumont.

Three gas lines tap the Laredo district, viz., those of the Houston Oil Co. of Texas, the Southern Natural Gas Co., of San Antonio and the Border Gas Co., of Laredo. A 12-inch welded natural gas line from the Laredo district to Brownsville is projected by the John Hays Hammond interests, who are understood to have already contracted with the Hope Engineering Co. for its construction. The Brownsville line would also serve intermediate towns between the field and its terminus, passing through a rich citrus fruit territory in the Rio Grande valley.

* * *

A NEW town to be known as Crane in Crane county, Texas, has been surveyed and lots are being sold by O. C. Kinnison, McCamey, Upton county. The new townsite is about 30 miles north of McCamey and a like distance south of Midland. It is near the oil development along the Crane-Upton county boundary where the Gulf Production Co. is drilling the McElroy ranch pool and north of which various companies are operating in the Church & Fields (University Land) pool. Crane county, which to now has never had a town in it, has no courthouse or separate county officers. Pending organization of Crane county, its affairs have been conducted through other county officers.

* * *

JOHN B. HOFFMEIER and Mike Healy, operating as drilling contractors with headquarters at Fort Worth under the corporate name of the Hoffmeier-Healy Drilling Co., are taking full advantage of the "boom" in wildcatting that proceeds ever westward from the San Angelo territory. The firm recently drilled the Connell A-1 well of J. S. Cosden et al, which has been showing oil at about 3500 feet in southern Ector county.

* * *

NOW comes the Devonian Oil Co., of Tulsa, getting into the West Texas territory with tests in Pecos county. The geological work of the Devonian has been carried forward by J. D. Watson and J. K. Keenan, in the field, working in conjunction with Forrest Rees, chief geologist, who has been spending much of his time recently at San Angelo.

MARTIN J. GAVIN, refining engineer of the United States Bureau of Mines, was recently an interested listener to a smoking room conversation on the Denver & Rio Grande Western railroad while traveling from Rifle, Colo., to Denver. The conversation had reference to the oil shale testing plant of the government at Rifle, where Mr. Gavin is in charge. The conversants didn't know Mr. Gavin, so he told the Western States convention at Denver, he "learned quite a little."

Notwithstanding that the first sample of oil was produced at the experimental plant, Sept. 18, and "that it may mean to the United States what the first oil produced from the first well meant," here is what Mr. Gavin said he "learned" in the smoking room: that the plant would never operate; that it was not intended to operate; that the "oil trust" would keep it from operating; that the tramway had eaten up all the money available; that the still was not working and would not work; that the plant was run by a bunch of kids, and that the superintendent was probably the biggest kid of the bunch.

Another case of smoking room misinformation bandied about by people who like to pretend they know something about the oil industry.

* * *

FOR the first time in history, oil produced in the Charco Redondo pool, southeastern Zapata county, promises soon to move out through Texas transportation arteries. Humble Oil & Refining Co. has erected a 55,000-barrel steel storage tank in the vicinity of the shallow pool and will move out the oil through a pipe line when a sufficient quantity has accumulated to make this feasible. The field was discoverd years ago when Zapata county ranchers got oil in hand dug wells put down for water. About 50 shallow wells in the pool produce 100 barrels or more, total daily. The crude when marketed in the past was hauled out in tank wagons. The property is now owned by R. R. Clark, who bought it about a year ago.

* * *

O. F. CASHDOLLAR, Pittsburgh, is starting a wildcat test for oil on the Abe Mayer ranch, 17 miles northwest of San Angelo, in Irion county, Texas. If there's anything in a name Cashdollar's operation ought to show something, since money at the casinghead is a good deal like the old expression of "laying it on the barrel head." Ben Case of Sterling City, Texas, has the drilling contract. The test will go to 3200 feet, it is announced, if necessary.

* * *

EYES of oil operators still turn from Mexico and elsewhere in the direction of Texas. Guillermo A. Alonzo, widely known in the Tampico district, is planning to extend his activities in the Laredo district. He will operate in the future under the style of the Alonzo, Jr., Oil Co., with headquarters at Laredo. Alonzo already has production from a half dozen wells in the Aviators pool of Webb county.

STOLL OIL REFINING CO.

INCORPORATED

REFINERS AND MARKETERS

PETROLEUM PRODUCTS

REFINERY AT LOUISVILLE

LOUISVILLE, KY.

ESTB'D 1896 STOLL SERVICE SATISFIES

ADDRESS ALL COMMUNICATIONS TO THE COMPANY

FOR ATTENTION OF

July 29th, 1926.

American Radiator Company,
816 So. Michigan Avenue,
Chicago, Illinois.

Gentlemen:

Replying to your favor, we have found Sterling Sections, which we have installed at our refinery very satisfactory.

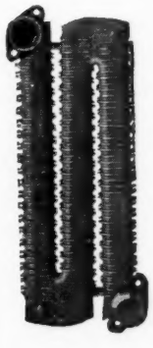
After purchasing the first carload of Sections from you we decided to replace with Sterling Sections. At the time of purchasing the second carload of Sections, we were figuring on putting in a new still and we found that by using the same condenser box we could work in the proper number of feet of radiation surface by putting two of our continuous stills through the same condenser box using Sterling Sections, in this way we were given a surplus box at the end of our row of condenser boxes, which we used for a new still, thus saving the necessary expense for a foundation and a condenser box pan.

In connection with our condenser box, we have found the Sterling Sections gave longer life for money invested than the condensers previously used.

Yours very truly,

STOLL OIL REFINING COMPANY.

By: Berry V. Stoll.
Berry V. Stoll, Mgr. Refg. Dept.



When the morning's mail brings us letters like this, we know we are right in recommending Sterling Oil Sections to every refinery.

The services of our engineers are at your disposal.

STERLING OIL SECTIONS

For manifold use — for continuous use — for cooling

AMERICAN RADIATOR COMPANY

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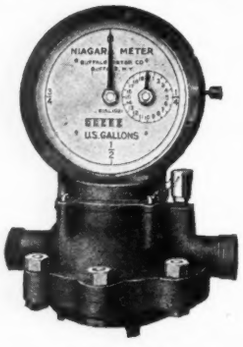
NIAGARA GASOLINE METERS



for wholesalers and bulk stations are giving their owners the most accurate check on sales and deliveries that is possible. We offer a 30-day trial to convince you.

Send for the new illustrated catalog telling about Niagara Meters "for any oil that flows thru a pipe."

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2889 Main St. Buffalo, N. Y.

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Over a thousand Oil Jobbers are buyers of Penn-Empire Products

THERE is a constantly increasing group of sagacious Oil Jobbers whose repeat orders say more than the printed word—that PENN-EMPIRE products are *good!*

To meet *your requirements* why not use PENN-EMPIRE products? 100% Pure Pennsylvania Crude Oil refined by real oil experts is strong assurance that you will receive your exact specifications—*on time!*

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PARAFFIN
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FUEL OILS
STOCKS
NEUTRALS

Permit No. 19

WHEN YOU BUY PENN-EMPIRE YOU GET THE BEST

(Cont'd from page 92)

covered originally with each unit of oil. A fairly uniform amount is put back into the wells, some gas is required to operate the compressors and there is some "popping" of the vents on the tanks.

Besides the increase in production that has been effected by the use of the gas lift in the South Udall field and the lowering of lifting costs, the Roxana's experience with its gasoline plant in this field has been similar to that in other fields using gas lift. A notable increase in gasoline recovery is obtained by passing the gas through the oil. This compensates for the slight loss in oil gravity, what is lost one place is picked up in another.

Ethyl Gas Introduced In California

LOS ANGELES, Dec. 13.—California during the past week received its first real introduction to "anti-knock" gasolines, when the Associated Oil Co. and the Union Oil Co. began the sale of Ethyl gasoline at their service stations. Prior to the appearance of Ethyl gasoline at these stations, a "teaser" advertising campaign was carried on through the state's newspapers, preparing the motor car owners for the advent of a premium motor fuel.

The first Ethyl gasoline was placed on sale Dec. 1 and the stations serving this product, new to the Pacific Coast, were gaily decorated. And the stations seemed to be doing a very good business, at a premium of 3 cents above the ordinary market. In Los Angeles, this made Ethyl gasoline sell at 19½ cents.

The experiment is being watched with much interest, as it is generally conceded that the best grade of California gasoline has anti-knock properties. Since no claim is made that Ethyl gasoline gives a greater mileage, other than removing the carbon, or rather, not forming carbon, and thus getting better results due to a better running engine. The success of the venture will not be known for some weeks, or until the car owners have had time to give the new motor fuel a real trial and reach their own conclusions.

To meet this new competition, Julian Petroleum Corp. has placed on the market a new fuel to be known as Red Chief, red in color, and selling at 3 cents premium. Claims made are similar to those made for Ethyl gasoline. Julian operates a number of company owned stations and in addition sells to numerous independent stations.

Gilmore Oil Co. meets the new competition with Boycite gasoline, selling at 1 cent premium.

Standard Oil Co., California Petroleum Corp. and Pan American Petroleum Co. are depending upon their new quick starting winter gasoline, selling at the usual service station price, to meet the competition.

New Equipment for Plant Improvement

Personal Notes of the Manufacturers

National Petroleum News

Dunn Painting Machine Co., 835 Howard St., San Francisco, Cal., manufacturer of Dunn single hose line paint spraying equipment for oil tanks, tank cars, etc., has published a catalog devoted to a description of Dunn patent painting machines and atomized painting.

Clement C. Dunn, inventor of the Dunn painting machine and painting process, states that he has discovered in experimental work that paint could not be thoroughly broken up and atomized without the use of a turbulence chamber. The painting machine with these features was developed. It operates on a single line of hose. Other advantages of the Dunn machine are, according to statements in the catalog, that it agitates the paint constantly by air so that pigments will not settle to the bottom, and that material being atomized in the machine itself enters the trigger gun or nozzle in that form, not in a liquid, thereby eliminating gun troubles. Low upkeep and greater operating ease are additional features, the company claims.

Distributing arrangements for Dunn machines have just been completed by Charles W. Harris, sales manager, in New York, Chicago, Detroit, Cleveland and Minneapolis, and arrangements are being lined up now in Cincinnati, St. Louis, Tulsa and Houston. Companies appointed as distributors in the five former cities are: The Burrshel & Co., Inc., 48 Front St., New York City; H. Channon Co., N. Wacker Drive and Randolph St., Chicago; The Charles A. Strelinger Co., 149-165 E. Larned St., Detroit, Mich.; Cleveland Tool & Supply Co., 1427 West 6th St., Cleveland, O.; and W. S. Nott Co., 2nd Ave. North, and Third St., Minneapolis, Minn.

* * *

Watson Perforating Co., Torrance, Calif., has issued a folder describing what is termed "The Roughneck Chain Puller," said to be both safe and fast. It is intended for use in taking up slack in chains so that new links can be replaced, and has a leverage of 8 to 1. It is simple. Folders will be mailed upon request.

* * *

CHICAGO.—Lincoln Steel Co., of which Harry G. Masten is president, recently moved its office nearer to the downtown business district of Chicago. The new address is 229 West Illinois street, which is in Chicago's famous "Near North Side." Larger quarters are being maintained there than at the former address at 2320 West 58th street. Lincoln Steel Co. manufactures Koro welding wire.

General Electric Co., Schenectady, N. Y., has just published a catalog on the MT control system for direct-current motors designed for use where it is necessary to start the motor under high or variable loads and run it under lighter load conditions, or where rapid and frequent reversals and stoppages form part of the duty. It is claimed that this system furnishes full protection to the motor during the periods when it is most needed without diminishing its ability to perform any work required by the normal demands. Illustrations and full description of the system are given.

Another bulletin has just been published by the company on pedestal bases for vertical motors to be used with both alternating and direct current vertical motors. They may be connected directly to the driven machines without mounting accessories.

* * *

Quaker City Iron Works, Inc., Philadelphia, Pa., manufacturer of truck tanks and steel dump bodies, has off the press bulletin No. 103 devoted to its line of truck tanks for oil deliveries. Its separable compartment construction whereby each compartment is an independent tank in itself, is described and illustrated. The bulletin also describes special truck tanks for fuel oil delivery and standard tanks for Fords. Gallonage recommendations and weights of the tanks are given. Quaker truck tanks in use by some of the largest oil marketers in the country are shown.

Bulletin No. 102 is devoted to gasoline tanks and fittings.

* * *

Botfield Refractories Co., Philadelphia, manufacturer of Adamant fire brick and fire brick cement, has appointed four new distributors for Adamant fire brick cement. They are, The Curtis Supply Co., Inc., Buffalo; The Waldreth Supply Co., Des Moines, Ia.; South Side Foundry & Machine Works, Charleston, W. Va.; and Empire Machinery & Supply Corp., Norfolk, Va.

* * *

The Botfield Refractories Co. has put out a booklet addressed to the refiners to tell the advantages of its product, Adamant fire brick cement, in refinery still and boiler settings. The booklet describes "how an Ohio refinery cut 50 per cent from brick repair costs."

* * *

Conley Tank Car Co., Pittsburgh, Pa., manufacturer of tank cars for oil transportation, has arranged for the construction of 300 new cars, half of which will be 8000 gallon capacity and half 10,000 gallon capacity.

A machine which will automatically pack five gallon oil cans into cases and at the same time detect any leaks in the cans has been invented by Glenn A. Smith, general manager of the Export Petroleum Co. of California, Los Angeles. This machine has been in use in one of the export casing plants on the Pacific coast for several months and has proven successful, according to Mr. Smith.

Describing the new device which is known as the Smith Automatic Five-Gallon Can Tester and Packer, Mr. Smith says: "Filled cans are delivered to this machine in pairs, lying flat on their sides, on either a gravity or belt conveyor. As each pair of cans reaches the machine, they automatically roll to an upright position immediately over the empty cases. The latter are delivered to the machine at right angles to the direction in which the cans are delivered, each case coming to a stop in the proper position to receive the cans. The cans are then fed into the cases through an adjustable throat, at which point they are tested by external pressure for leaks. The leaks are detected at this point as the pressure applied is sufficient to eject the liquid through the leaking point, if any. Immediately after that, the cans are placed in the case, the filled case leaves the packer by a counter balance arrangement and the next empty case takes its position. The tester and packer has a capacity for packing more than 10,000 cans daily.

* * *

Butler Mfg. Co., Kansas City, manufacturer of oil marketing equipment and ready-made steel bulk stations, has moved its general offices from the down town section of Kansas City, to its plant at 13th and Eastern Sts. An addition is being made which will include quarters for the executive and general offices and enlarge the cafeteria, locker rooms and factory offices. The new quarters will have an area of about 15,000 square feet. The work will be completed about Dec. 1. Only a few months ago the company added a ready-made steel warehouse, 76 by 128 feet, to its present plant.

* * *

LOS ANGELES—Joe Regan, president of the Regan Forge & Engineering Co., San Pedro, Cal., and Bert Cleveland, in charge of sales for the Regan organization in California, left Los Angeles last week to visit several oil centers of the country prior to the American Petroleum Institute meeting at Tulsa. They expect to reach Tulsa Dec. 6.

Visiting Around the Refineries

By Paul Truesdell

National Petroleum News

Another Phase of the Coal Hydrogenation Processes

THERE is a side to the development of processes for making gasoline and oil out of coal which is generally overlooked in consideration of their practical value, American chemists point out. Much discussion of the subject was brought out among oil technologists by the reading of papers by Bergius and Fischer at the recent International Conference on Bituminous Coal at Pittsburgh.

Production of motor fuel is really only secondary in the minds of Germans who have made the greatest advances in the development of the coal-to-oil processes, it is said. A primary feature of the processes is that they make possible the production of good lubricating oil. Perhaps in the minds of the Germans there is still the thought, kept in the background, that Germany must prepare for another war. One of the most vitally necessary commodities in making war is lubricating oil.

American chemists are inclined to think that fear of an inadequate supply of motor fuel does not bother the Germans much but that they do fear a shortage of lubricating oil. Americans who were active in war work, and were in position to know, say that lack of lubricants oppressed the Germans during the world war much more than did lack of motor fuel.

That puts an entirely different complexion on the processes from the standpoint of practical value. If they can assure Germany an adequate supply of lubricating oil in case supplies from the outside fail, probably they are well worth developing regardless of whether they are economical as means of a manufacturing motor fuel or not. And of course, that feature would count for nothing in this country.

Has a Good Many Strings to His Bow

COLONEL GEORGE A. BURRELL of Pittsburgh seems to rank well up in front with those whose habitual job it is to keep many irons in the fire. However, he recently found opportunity to spend a month in California with Mrs. Burrell.

The colonel says he is working on a book on refinery technology which is to be published by the Chemical Catalog Co. in the spring. The Burrell Oil & Gasoline Co., of which he is president, is operating a charcoal natural gasoline plant of 5000 gallons a day capacity at Claysville, Pa., turning out gas machine gasoline of 97 per cent recovery, stove gasoline of 30 pounds pressure, ordinary grades of natural gasoline and a special anti-knock fuel consisting of California gasoline and natural gasoline.

Besides these activities, the colonel and his brother, Guy H. Burrell, own the Burrell Technical Supply Co., Pittsburgh, where a complete line of scientific apparatus for the oil industry is handled, much of which is made in the company's own shop. The colonel also has been employed for some time as expert technologist by the Dubbs interests. We wonder how he spends the rest of his time.

Open Symposium on Gasoline at M. I. T.

OIL technologists will want to check on their calendars the date Jan. 15, 1927. That is the date of the symposium on gasoline to be held at Massachusetts Institute of Technology, under the auspices of the northeastern section of the American Chemical Society. Leading authorities, including Dr. Warren K. Lewis, Dr. A. C. Fieldner, Dr. Graham Edgar and T. A. Boyd are to speak on various phases of the subject. All who wish to attend are invited to the meeting which is scheduled as the largest ever held devoted exclusively to discussion of liquid fuels.

More Dubbs Cracking Units Going In

STANDARD OIL CO. of California is immediately to install eight Dubbs units at its El Segundo refinery, according to J. G. Alther, secretary of the Universal Oil Products Co. Each unit will have a capacity of 3000 barrels a day. This is in addition to one Dubbs unit the company already has in operation and seven which are under construction at the company's Richmond refinery. These are also 3000-barrel a day units.

The White Star Refining Co., Wood River, Ill., also has started construction of a Dubbs unit in addition to the two already in operation there, according to Mr. Alther.

E. M. Clark Denies Big Refinery Plans

LAST week we quoted from the New York newspapers that the Standard Oil Co. of New Jersey had appropriated $150,000,000 to be spent over the next two years for new refineries and refinery expansion.

E. M. Clark, vice president of the Standard of New Jersey, says this is not true. Mr. Clark says that no extraordinary expenditures are contemplated during the coming year, only such changes and extensions being made as are required by the demands of the market or the nature of the crude available to the company.

Speaking of Volatile Gasoline

J. H. ARCHER, superintendent of the Barco Gasoline Co. at Wirt, Okla., says a tower has recently been installed at his plant which takes out gasoline that will boil at 90 degrees below zero F. They get about 100 gallons of this product per 2000 gallons total output. This wild stuff is used for cooling in a condenser instead of water, is then run to a stock tank and weathered down to 80 per cent recovery and used for cleaning purposes.

Refinery Laboratory Prepares Water for Batteries

THE Loreco Diamond, official magazine of the Louisiana Oil Refining Corp. at Shreveport, states in the October issue that distilled water to be distributed for battery service at the company's filling stations, is prepared at the refinery laboratories under supervision of F. J. Mechlin, chief chemist at the Bossier City refinery.

Fish Give Refinery Men the Laugh

THE Loreco Diamond, quoted above, sets forth a tantalizing situation that confronts the men employed at the company's Shreveport refinery. Cross lake adjoins the refinery and the city of Shreveport, by ordinance, prohibits fishing in the lake. The men say the lake is full of fish, big ones too, that frequently come to the top of the water and grin at the foiled fishermen.

Youngstown TANKS
STANDARDIZED

The main thing we are bent upon piling up is good-will. Reputation is one of the most valuable assets of any business.

As a testimonial of the progress being made by this company and an evidence of the respect paid its product by the tank buying world, it gives us a great deal of satisfaction to announce that shortly after the first of the year we will move into our new plant.

In our new location we will have four times our present floor space. Our production will be tripled. Our property will consist of 11½ acres of ground right in the heart of Youngstown.

Write for a free copy of Bulletin 500 for complete information concerning Youngstown Tanks.

The YOUNGSTOWN BOILER & TANK Company
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ROBERTSON METAL SIGNS

THE best way to appreciate the superior craftmanship of the Robertson artist is to get a sample Robertson sign and inspect it.

The Coca Cola sign shown below is just coming out. Watch for it. It marks a long stride forward—large signs in one piece. This sign is 18″ by 54″ with a stamped frame that gives it rigidity and a very striking appearance.

Because of its unusual shape the new "Coca Cola" fits into upright spaces heretofore unsuited for signs of size. The colors are wonderful, and the bottle a real triumph for the artist who sketched it. If this bottle isn't full and ready to pop, it certainly belies its looks.

Anticipate the placing of your next order by having us submit sketches and quotations now.

The W. F. Robertson Steel & Iron Co.
The Elwood Myers Co., Div.
Springfield, Ohio

Here & There

National Petroleum News

"Is any trout safe?" might be the query next April when three skilled fishermen throw out their lines into Florida waters at that time. Arranging such a trip now in New York City is Lionel T. Barneson, president of General Petroleum Corp. of California, Los Angeles, who is famed as the Klamath River steelhead trout fisherman. He will be accompanied on the fishing trip by B. H. Stephens, vice president of the Magnolia Petroleum Co., and A. C. Woodman, head of the Crown Central Petroleum Corp., New York, who is frequently styled the premier Florida fisherman.

* * *

Thomas A. Stevens, general superintendent of gasoline operations for the Owen Gasoline Co., Caney, Kan., married Miss Velma Hemphill, of Caney, on Nov. 25.

Mr. Stevens is now engaged in building a booster station at Caney for the Union Gas Corp., parent company of the Owen company, according to John H. Lewis, plant superintendent of the latter.

* * *

H. B. Osborne, an old-time resident of Franklin, Pa., who has been with the Paragon Refining Co. for the past 25 years, has resigned to become superintendent of the Empire Oil Works at Oil City. Mr. Osborne has already assumed charge of his new duties.

* * *

Laird A. Craven, formerly salesman at Columbus, O. for the Refiners Oil Co., Dayton, O., has resigned to become salesman in the lubricating oil department of the Pure Oil Co. at Pittsburgh.

* * *

Dod Curtin, salesman for the Mid-Continent Petroleum Co. of Iowa, spent Thanksgiving day in Chicago where he witnessed the Army-Navy football game.

* * *

W. Wiley Rice, assistant sales manager of Barnsdall Refining Co., Chicago, was calling on Michigan jobbers during the first three days of this month on 1927 contract business.

Junior Here and There

A daughter, Lucille Frances, was born on Nov. 2 to Mr. and Mrs. F. E. Miller. Mr. Miller is manager of the Texas City, Tex. ocean terminal of the Marland Refining Co., Ponca City, Okla.

W. S. Townsend, president of Guarantee Liquid Measure Co., Rochester, Pa., accompanied by Mrs. Townsend and son Billy, left Rochester recently by motor for Bainbridge, Ga., where they will remain until the first of the year. Previous to his departure, Mr. Townsend talked to department heads, expressing appreciation for results this year, according to "Fry News," house organ of the company.

Mr. and Mrs. Townsend were accompanied by Mrs. G. Kenneth Fry and son, who will go to Florida for the winter; by Leo Deutsch, director of the research department, who will join Mrs. Deutsch in Florida for a brief visit; and by Alex Pearson, manager of the Fry pumps baseball team. Mr. Pearson will be Mr. Townsend's hunting companion.

* * *

J. B. Edwards, who has been in charge of refinery operations at Wood River, Ill., for the White Star Refining Co. of West Virginia, with headquarters at Detroit, Mich., has been appointed vice president and general manager, according to H. B. Earhart, president.

Mr. Edwards has had a varied and long experience in the oil industry. Previous to his connection with the White Star company, he was manager of the Bayonne refinery of the Tide Water Oil Corp., and also a member of the board of directors.

* * *

Fredrick W. Howell, Dayton, O., who was formerly secretary, treasurer and attorney for the Dealers Oil Co. of Dayton, is not now engaged in the oil business but expects to re-enter soon, either for himself or with some other company. Mr. Howell is at present handling legal work for several dealers and oil companies.

* * *

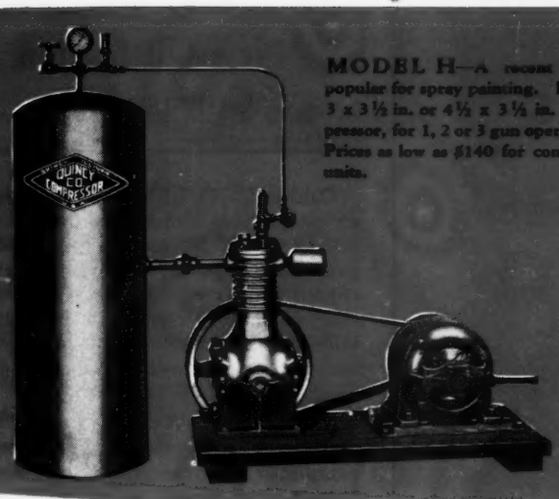
Walter McAdams, vice president in charge of the eastern district at New York City for Guarantee Liquid Measure Co., Rochester, Pa., was operated on recently. He is reported recovering but was to be confined to the hospital for 10 days.

* * *

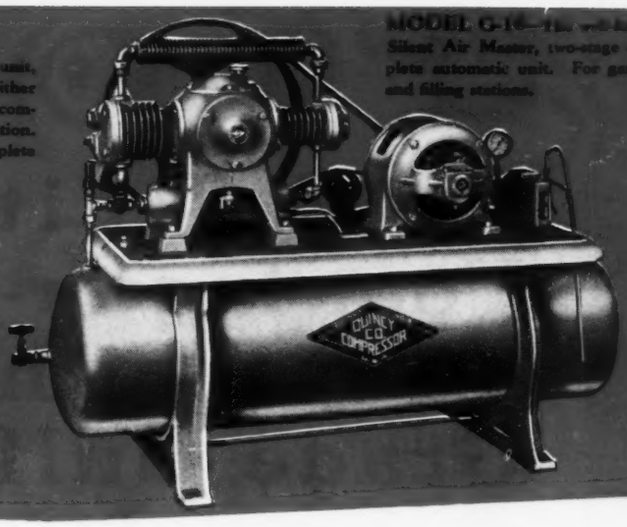
L. B. Patterson, gasoline sales manager of Acme Petroleum Co., Chicago, escaped the chilly winds off Lake Michigan early this month by going to Florida on personal business.

* * *

Mary Alice Scott, who has been for the past two and a half years, with the Wiser Oil Co., at Bartlesville, Okla., has resigned to accept a position with the Phillips Petroleum Co.



MODEL H—A recent unit, popular for spray painting. Either 3 x 3½ in. or 4½ x 3½ in. compressor, for 1, 2 or 3 gun operation. Prices as low as $140 for complete units.



MODEL G-16—The well-known Silent Air Master, two-stage complete automatic unit. For garages and filling stations.

Free Air? Laundry? Painting? Tools?

Get a Quincy Compressor

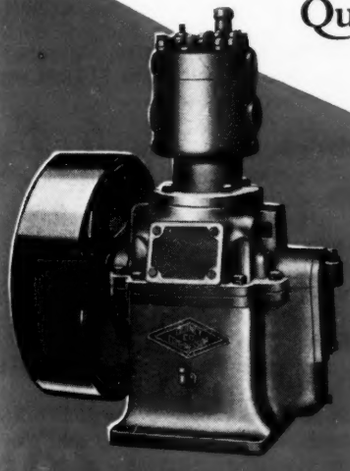
YES, there's a special Quincy for each air job in your garage, station or shop. The famous Silent Air Master series for filling tires in a jiffy. Sturdy water-cooled units to help you make car washing profits. Portable and stationary models for your paint spray. And many more besides, for pneumatic tools, hoists, sand blast equipment, and all the other modern air applications.

In every case you get a compressor that will bring in dividends. By supplying the clean, dry, uniform air that makes for economical production. By delivering uninterrupted service on a life-time basis.

So that you may be fully informed about Quincy Compressors and their applications, our engineers have prepared a series of specification bulletins. You'll find them of both interest and value. May we send you a set, without cost or obligation? The coupon is handy now—sign and mail it.

Quincy Compressor Co., Quincy, Ill.

Formerly Wall Pump & Compressor Co.



MODEL W

A leader among water-cooled compressors, for all heavy duty work. Four sizes from 4½ x 4 in. to 6¼ x 5 in. duplex.

QUINCY COMPRESSOR CO.
223 Maine St., Quincy, Ill.

Yes, you may send along your Specification Bulletins on Quincy Compressors.

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Quincy QUINCY ILLINOIS QUINCY CO. COMPRESSOR U.S.A. **Illinois**

We Solicit Your Inquiries On High Grade Gulf Coastal Lubricating Oils

200 to 2000 Viscosity
Pale and Red
ZERO COLD TEST

Shipments in Tank Cars, Compartment Cars and Steel Drums.

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National Petroleum News
801 Caxton Bldg. Cleveland, Ohio

New Oil Station Construction

Caldwell, O.—Ehlermann's Service, an oil jobbing and marketing firm conducted by T. M. and J. C. Ehlermann, and throughout Noble county, has purchased property in Barnesville, O., with railroad siding, on which it will erect bulk and service station. Tires, tubes and accessories will also be handled.

* * *

Aviston, Ill.—William L. Albers is building filling station which will be completed by the first of the year. Pierce Petroleum Co. products will be handled.

* * *

Urbana, O.—Garage, filling station and auto sales room is being erected here by H. W. Houston and Harry Brown.

* * *

Coupeville, Wash.—Union Oil Co., Los Angeles, purchased property for bulk station. Property is 175 by 200 feet.

* * *

Sioux City, Ia.—Miller Oil Co. is building service station here, according to Herman F. Miller, general manager.

* * *

Elsie, Neb.—W. O. Troxel is completing filling station, to be operated in connection with Elsie Motor Co.

* * *

Kenosha, Wisc.—Donnelly-Hidlay Oil Co. is erecting service station here, which will open by Dec. 1.

* * *

Kensington, N. Y.—Louis Fishman will build filling station at Bailey and Easton Sts.

* * *

Smethport, Pa.—Metro Stations, Inc., Olean, N. Y., will build $12,000 service station here.

* * *

Eveleth, Minn.—Standard Oil Co. of Indiana was granted permit for service station.

* * *

Dakota City, Neb.—Louis Kilmer, Winnebago, Neb., is building filling station.

* * *

Tulsa, Okla.—Transcontinental Oil Co. is building one service station here.

* * *

St. Charles, Mo.—John J. Stock purchased property for filling station.

* * *

Ennis, Tex.—Home Industrial Oil Co. to erect bulk and filling station.

* * *

Canton, Kan.—E. P. McGill is completing filling station.

* * *

Fremont, Neb.—Lewis Oil Co. to build filling station.

* * *

Negaunee, Mich.—Granlund Oil Co., Negaunee, has purchased property for

bulk and service station at Marquette. Mich., which will be erected in the spring, G. R. Granlund, manager, reports.

* * *

Trenton, N. J.—Edwin S. Hall to build service station to cost about $9,500 on Princeton Ave.

* * *

Jamestown, N. D.—Wakeman Bros. building filling station to handle White Eagle products.

* * *

Traverse City, Mich.—A service station is being built here by W. O. Garrett.

* * *

Omaha, Neb.—Paul Pattavina to build filling station at 10th and Pacific Sts.

* * *

New Lexington, O.—Pure Oil Co. is building bulk and service stations here.

* * *

Elgin, Ill.—Herman Bunge is seeking permit for filling station.

* * *

Fayette, Mo.—Home Oil Co. plans to build filling station.

* * *

Houston, Tex.—Galena-Signal Oil Co. to build filling station.

* * *

Independence, Mo.—F. E. Hall to build filling station.

* * *

Topeka, Kan.—C. A. Welburg to build filling station.

* * *

St. Paul, Minn.—H. M. Miller to build filling station.

* * *

Houston, Tex.—Sid Westheimer will erect filling station.

NILES—Another filling station here has been opened by Claude J. Huff, distributor of Shell products. This is the third station opened by Mr. Huff within the year and all are reported doing good business.

NILES, MICH.—Gafill Oil Co. has completed a service station here at a cost of about $50,000, according to reports. It is reputed to be one of the most attractive in this section.

LONDON, O.—F. W. Oldham has completed a service station on the National highway 20 miles west of Columbus to handle goods of the Refiners Oil Co., Dayton.

BENDON, MICH.—Charles Morse has opened a service station here on M-11 highway, handling products of the Standard Oil Co. of Indiana.

GROTAN, S. D.—High Grade Oil Co. opened a service station at Aberdeen, S. D., Oct. 23, according to A. McKiver, secretary-treasurer.

COLUMBUS, O.—Its eleventh service station here has been completed by the Refiners Oil Co., with headquarters at Dayton, O.

SINCLAIR OILS
REG. U.S. PAT. OFF.

"We find Rand McNally Coupon Books singularly adapted to our business"

says A. H. Sus, Manager, Central District, Sinclair Refining Company

"We are using Rand McNally & Company's coupon books which we find singularly adapted to our business. Our bookkeeping and accounting at service stations are materially expedited thereby.

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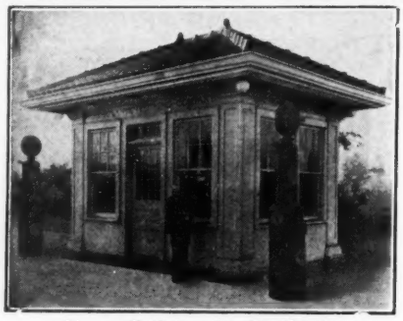
Chemists and Engineers

The revised tenth edition of OIL ANALYSIS by A. H. Gill, is ready for you. It has added a section on the examination of motor gasoline and a description of the latest model Mac-Michael Absolute Viscosimeter, and has been brought thoroughly down to date.

The price is still $2.50. Send us your check and let us mail a copy of it to you:

NATIONAL PETROLEUM NEWS
808 Caxton Building Cleveland, Ohio



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Your own men can erect them.

They're permanent.

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25 BROADWAY

A. M. MAXWELL
VICE-PRESIDENT & SALES MANAGER

NEW YORK
December 15, 1926

Dear Mr. Oil Man:

Here's an interesting thing to know:

To every gasoline used by winning drivers in official A.A.A. races for the past several years, Ethyl Brand of Anti-Knock Compound has been added. In fact, Ethyl Brand of Anti-Knock Compound has made possible the improved, small displacement, high compression motors now used for racing

Any gasoline, when treated with Ethyl Brand of Anti-Knock Compound, becomes "Ethyl Gasoline." For while the amount of compound added is infinitesimal, it turns the gasoline thus treated into a completely "knockless" fuel and a perfect fuel for every type of motor.

Ethyl Gasoline is now a nationally-distributed product. Even the man who loves to roam the country in his car can make Ethyl his regular fuel without real inconvenience.

And if you've tried Ethyl in your own car, you know yourself how much it adds to the pleasure of driving!

Yours for less gear-shifting,

A. M. Maxwell

WITH ETHYL BRAND OF ANTI-KNOCK COMPOUND — ETHYL GASOLINE CORPORATION, NEW YORK, U.S.A. — Knocks out that "knock"

Oil Patents Issued Recently

Refining

Oils.—Almer McD. McAfee, Port Arthur, Tex., assignor to Gulf Refining Co., Pittsburgh, Pa. Filed Mar. 27, 1922. No. 1,608,329.

Process for Purifying Oils and the Like.—Harry M. Ridge and William Richard Hodgkinson, London, England. Filed Mar. 3, 1923. No. 1,608,339.

Preventing Loss of Volatile Liquids.—Jean Henry Bregeat, Paris, France. Filed Sept. 19, 1923. No. 1,608,365.

Flow Box for Oil Lines.—Harry A. Campbell, Wichita Falls, Tex., assignor of fifteen-sixteenths to Thomas Lomax, Jr., Wichita Falls, Tex. Filed May 27, 1926. No. 1,608,369.

Apparatus for Absorption of Hydrocarbons.—Daniel L. Newton, Fullerton, Calif. Filed July 19, 1924. No. 1,608,416.

Miscellaneous

Tank Cleaner.—Walter W. Foster, Wichita Falls, Tex. Filed Jan. 29, 1926. No. 1,607,669.

Method and Apparatus for Determining, Indicating, and Recording the Calorific Value of Liquid and Gaseous Fuels.—John Motley Morehead, Rye, N. Y. Filed Feb. 2, 1923. No. 1,607,684.

Composite Motor Fuel.—Clay M. Hudson, Manila, P. I. Filed June 2, 1922. No. 1,607,891.

Tummel Oven for the Coking or Distillation of Fuels.—Otto Heitmann, Lintfort, Germany. Filed Oct. 28, 1921. No. 1,608,210.

New Publications

"The Science of Modern Tank Venting" is a handbook on tank venting, replete with charts, sets of specifications to meet all venting conditions and a thorough digest of every subject relating to venting, by Stephen H. Brooks, president of the Brooks Engineering Corp. of Los Angeles. He has had twelve years of specialization on the subject. A limited edition has been printed and copies may be obtained gratis from the Brooks Engineering Corp., 1325 Maple Avenue, Los Angeles.

George Back with Amerada

TULSA, Dec. 11.—Ed. George, who left the Amerada Petroleum Corp. a short time ago to join the Independent Oil & Gas Co. organization, has resigned from that company and is again with the Amerada. He is with the land department, and represents the company at Shawnee, Okla.

MOHALL, S. D.—The new filling station of the Mohall Independent Oil Co., which opened for business this fall, is reported to be doing good business in Fyre Drop gasoline and Pennco motor oil. S. A. Lofthus is owner.

ON THE LAZY BENCH

National Petroleum News

Her Error

The car gave a lurch and the young man sat down in the fashionable lady's lap.

She began: "I wish you to understand that I am not a lamp post or a piece of furniture to be clung to for support. You have no right to crowd in and tear other people to pieces with your big, clumsy hands. You pitiful clown, you! You aren't fit to be allowed among nice, quiet, well-dressed people! You unmannerly bumpkin! You deserve—"

"Excuse me, madam," broke in the young man. "I think you have made a mistake."

"A mistake!" demanded the lady, eyes flashing with anger. "What do you mean?"

"Just this madam," he replied; "I am not your husband."

—Bridgeport Driller

◈ ◈ ◈

Out for Damages

Letter said to have been received by a lawyer:

Dear Sir—My boy got struck by an automobile, number 48726B. If the owner is rich, sue him at once. The boy wasn't bruised any, but on your notifying me that you have brought suit, I will hit him in two or three places with a hammer. Yours truly, etc."

—Magnolia Oil News

◈ ◈ ◈

Taxi Driver: "Where shall I drive you, sir?"

Reveler: "I don't care—Shay, d'you know where Johnson street is?"

Taxi Driver: "Yes."

Reveler: "Well, don' drive me there—thash where I live."

—Keene Thrusts

◈ ◈ ◈

Hunting, All Right

Two negro women met on the street. "Land sakes, Opal," said one, "Why such elegant finery on? You look like you mought be huntin' fo' a husban."

"I am, Lily, I am."

"Why, I thought you was married to that Rastus Brown."

"I am; that's the one I'm hunting for."

—Magnolia Oil News

◈ ◈ ◈

A woman was recently awarded a prize for sitting through a comic film without smiling. And to think that we have often paid half a dollar for doing the same.

—Keene Thrusts

◈ ◈ ◈

The bigger the summer vacation, the harder the fall.

—Union Oil Bulletin

A Mother to Guide Him

Little Ikie was working at his first job. Every Saturday night he received three nice crisp one-dollar bills. At the end of the first week he brought the three dollars home and gave them to his mother. When the second Saturady rolled around he turned only $2.97 to his maternal parent. By the third Saturday things were getting no better rapidily and he came home with only $2.93. This excited some comment in the Cohen home, but not until the fourth week when Ikie again came in seven cents short were Mrs. Cohen's suspicions thoroughly aroused. Calling her son to her, she said:

"Now, Ikie, Don'd hev no sicritss from momma. Tell me de truth, Ikie, hev you gotten yourself a goil?"

—The Pure Oil News

◈ ◈ ◈

He was holding forth from the summit of a soapbox.

"These pills, ladies and gentlemen," he shouted, "are one of the wonders of the world! They are absolutely marvelous. Why, in my own case, let me tell you that four years ago I was a miserable wreck; my face was yellow and haggard, my figure bent and I had the look of a hounded man. What I ask, and I ask it again and again—what has brought this change in me?"

The silence was broken by one of the audience, who mildly inquired:

"What change?"

—Keene Thrusts

◈ ◈ ◈

Enforced Penance

A colored parson, calling upon one of his flock, found the object of his visit out in the back yard working among his hen coops. He noticed with surprise that there were no chickens.

"Why, Brudder Brown," he asked, "whah'r all yo' chickens?"

"Huh!" grunted Brother Brown without looking up, "some fool nigger lef' de do' open an' dey all went home."

—Magnolia Oil News

◈ ◈ ◈

Mark of Wealth

"Jones must be pretty well fixed financially."

"What makes you think so?"

"Well, every time that I see him he has the hiccups."

—Union Oil Bulletin

◈ ◈ ◈

The Thirst for Vengeance

"Willie, what is your greatest ambition?"

"To wash mother's ears."

—Magnolia Oil News

Something New in Cases

The bottles are held securely at the bottom by a narrow ledge, and at the top by a spring clip around their neck. There is a partition between each bottle which eliminates any chance of breakage and scratched labels.

The case itself has a stiff box frame, covered with smooth black cowhide, French sewed at edges, and lined with red velvet. Contains fourteen 4 oz. cut-bottom bottles with metal capped corks and ten ½ oz. squat grease jars held by adjustable bar. 209 Complete, with your name embossed in gold, only $15.75

Less 10% for cash.

Other Styles in our FREE Catalog

L-U-C-E

Builders of Sales Luggage

614 Delaware KANSAS CITY, MO.

"CUT OIL"

is a problem in CHEMISTRY

An "emulsion" represents a condition of a liquid which can be fully, scientifically and economically corrected by use of the chemial process. Use TRET-O-LITE process when you have cut oil and tank bottoms that require treating.

Wm. S. Barnickel & Co.

St. Louis, Mo.

Tret-O-litE

Reg. U. S. Pat. Off.

Dependability

Please remember—
back of the dependable—
Fry Visible Pump—
is a tremendous—
nation wide—
advertising campaign—
in the Saturday Evening Post—
to help you—
in your constructive work—
of teaching—
your service station operators—
the value of courteous, alert service—
Jimmy the Courtesy man—
is the means Fry employs—
to build up the morale—
of every Fry operator—
That's Fry's idea—
of service to Fry customers—
to your men—
and to your customers—
the Public.

Jimmy—the Courtesy Man

Fry's ever increasing volume of sales tells the story

GUARANTEE LIQUID MEASURE COMPANY, Rochester, Pa.
Fry Equipment Co., Ltd., 401 Royal Bank Building, Toronto, Ontario

Fry Visible Pump

Refinery - Tank Wagon Markets

National Petroleum News

Mid-Continent Gasolines Firm With High Gravities in Demand

Staff Special

TULSA, Dec. 11

THE Mid-Continent refinery markets were left largely to themselves this week while the American Petroleum Institute was in session in Tulsa, but despite this seeming lack of attention prices remained on an even keel with only fractional changes, and those upward.

The prevailing range on 58-60 U. S. Motor moved up from 9¼ cents flat to 9¼ to 9½ cents, the lower gravities responded accordingly, and the higher gravities stepped forward under stimulus of continued good demand. Natural gasolines moved up slightly in price late in the week. Kerosenes and distillates marked time, gas oil became scarcer and higher in price, while fuel oils quietly held their ground.

Exporters for the most part were inactive during the week. Representatives of practically all the companies were in Tulsa for the meeting, and if any purchases were made at that time no announcement has been made to date.

Early this fall the writer made reference in these columns to the fact that one Oklahoma refiner was blending some of his 58-60 U. S. Motor with natural gasoline and selling it to a few jobber customers who had to compete with The Texas Co. 60-62 gravity gasoline.

Others Now Blending

A CANVASS of the Oklahoma field this week reveals that at least 12 of the larger refiners are following the same practice now, some of them on an extensive scale. On the present Grade C natural gasoline market these refiners are asking a quarter of cent above their U. S. Motor price for the blend, which runs 60-62, 437 end point, or sometimes slightly lower end point. This price, they say, lets them just about break even.

An indication of just how extensive this practice has become can be gathered from the fact that one large refiner in one day this week booked orders for 63 cars, while another refiner in a trip through the northern consuming territory found that several jobbers had been or were preparing to make contracts for over next year for this material.

The sales manager for one large refinery expressed the opinion recently that if the Standard Oil Co. of Indiana announces a policy of meeting competition on 60-62 gravity gasoline generally throughout its territory, this 60-62, 437 end point gasoline will usurp 58-60 U.S. Motor and become one of if not the criterion of the gasoline market.

He said refiners have very little to lose by making the material, other than the additional cost of blending, since it meant they would get to move their U. S. Motor just the same.

Natural gasoline manufacturers meanwhile are watching the situation closely for they realize the more blending there is the better will be the demand for their product.

Buyers have been able to get raw naphtha this week at 9 to 9⅛ cents per gallon, but with only one or two plants making doctor test material at present, quotations have been as high as 9¼ cents.

While the domestic demand for the 56-58 and 58-60, 450 end point gasoline has been slow, a few refiners making these two grades have been blending for a 60-62 gravity product as has been with U. S. Motor blending. Prices accordingly have been at their usual differential under U. S. Motor.

Few Holding Inventories Down

SEVERAL refiners say they have been working on a hand-to-mouth basis this month in an effort to cut down inventory for the first of the year. Jobber buying has been along the same general plan and orders for U. S. Motor continued to be in small lots and for rush shipment. That the demand even under these conditions has been good is evidenced by the fact that one refiner today advanced his price to 9¾ cents, f.o.b. Group 3, while sales managers for two other refineries stated they probably would put out 9¾-cent quotations Monday.

Refiners making 60-62, 400 end point gasoline have found the 60-62, 437, end point blend cutting into their business to some extent, with the result that the straight 400 end point grade has not been as quick to respond to the upward price trend. Marketers have been able to pick up odd cars at prices from 10 to 10¼ cents but the bulk of material has been going at 10¼ cents and up. One refiner has been oversold with the result that he has had to buy on the outside and his price has been advanced to 10⅝ cents.

Gasoline of 64-66, 375 end point specifications has become relatively scarce in both Oklahoma and Texas. Refiners in the latter area have only a few cars available for domestic shipment, export orders taking care of practically all their output. With this situation in Texas the domestic trade has been looking to Oklahoma to supply much of his gasoline and the demand has been exceptionally good so far this season.

Marketers reported today they were unable to find any quantity of 64-66, 375 end point gasoline in Oklahoma at 10¾ cents. A majority of the refiners were quoting 11 cents for their product.

Naturals Moving Well

NATURAL gasoline manufacturers report there is no distress material in the field at present. Two companies have been buying on the outside to fill out on their orders. One of them has been buying all Grades while the other has bought Grades A, AA and B.

Grades A and AA, after remaining at 9¼ to 9½ cents for the past several days, was somewhat stronger Friday and Saturday, the bottom on Grade AA being 9⅜ cents, with Grade A easily bringing 9½ cents.

Grades B and BB were also firmer but not sufficiently to cause price changes. These two grades naturally are more plentiful at this season of the year and prices respond more slowly to upward changes.

Grade C also was moving up slightly after hovering around 8¼ cents for several days. One company which does not make much Grade C was asked to quote on 10 cars of doctor test material early this week. They quoted 8½ cents, not expecting to get the order, their salesmanager said. They did, however, and after shopping aroundto cover on it,

(Continued on page 117)

JENKINS CRACKING PROCESS

at the plant of

Bartles Maguire Oil Co.

Operating figures of this installation show clearly how a cracking process can make money for the refiner.

The highest financial returns are possible only through a combination of desirable factors. For example: this plant has an operating factor of 94% (only 6% of the time is required for cleaning and repairs). The loss is less than 2%— not crediting the gas formed which is sufficient fuel to operate the plant.

Any Jenkins installation will bring large financial returns. Substantiating figures will be given where desired.

GRAVER Corporation Founded 1857

EAST CHICAGO, INDIANA

NEW YORK Grand Cent. Term. | CHICAGO Steger Building | TULSA Atlas Life Bldg. | HOUSTON West Building

Refinery Markets on Light Oils and Lubricants

Pennsylvania, Oklahoma, Kansas, North and South Texas, Louisiana, Arkansas, California and New England

GASOLINE AND NAPHTHA

PENNSYLVANIA	Prices Dec. 13	Prices Dec. 6	Prices Nov. 29
52-54 Naphtha	11½-12	11½-12	11½-12
54-56 Naphtha	11¾-12	11¾-12	11¾-12
58-60 Gasoline	11¾-12	11¾-12	11¾-12
60-62 Straight-run gasoline	12½-13	12½ 13	12¾-13
64-66 Straight-run gasoline	13½-13¾	13½-13¾	13½-13¾
68-70 Straight-run gas.350-360 E.P.	-14½	-14½	14 -14½
68-70 Straight-run gas.305-320 E.P.	19 -20	18 -20	17 -18
OKLAHOMA			
48-50 450 E. P. naphtha	9 - 9¼	8¾- 9	8¾- 9
50-52 450 E. P. naphtha	9 - 9¼	8¾- 9	8¾- 9
56-58 450 E. P. gasoline	8¾ 8⅞	- 8¾	8½- 8¾
56-58 U. S. Motor gasoline	9	8¾- 9	- 8¾
58-60 450 E. P. gasoline	8⅞ 9	8¾- 8⅞	8⅝- 8¾
58-60 U. S. Motor 437 E. P.	9¼- 9½	- 9¼	8¾- 9¼
60-62 400 E. P. gasoline	10¼ 10½	10⅜-10⅝	10 -10¼
64-66 390 E. P. gasoline	10½ 10¾	10⅜-10⅝	-10¼
64-66 375 E. P. gasoline	10⅞ -11	10⅝ 10⅞	10½-10¾
68-70 350-360 E. P. gasoline	11¼-11½	11¼-11½	11⅛-11½
64-66 437 E. P. blend	9 - 9⅛	- 9	- 8¾
KANSAS*			
58-60 U. S. Motor gasoline	9½- 9⅝	9¾- 9½	9⅜- 9⅝
60-62, 400 E.P. gasoline	10½-10¾	10½-10¾	-10¼
64-66, 375 E.P. gasoline	11 -11¼	-11	-10¾
*F. O. B. refinery Kansas destination.			
NORTH TEXAS			
48-50 450 E. P. naphtha	9 - 9¼	8¾- 9	8½- 8¾
56-58 450 E. P. gasoline	8¾- 8⅞	8½- 8¾	8¼- 8½
58-60 450 E. P. gasoline	8¾- 9	8⅝- 8⅞	8¼- 8½
56-58 U. S. Motor gasoline	9 - 9⅛	8⅞- 9	8½- 8⅝
58-60 U. S. Motor gasoline	9¼- 9½	9 - 9¼	- 8¾
64-66 390 E. P. gasoline	10⅜-10⅝	10¼-10½	10 -10⅜
64-66 375 E. P. gasoline	10¾-11	10⅝-10¾	10¾-10½
68-70 350-360 E. P. gasoline	-11½	11¼-11½	11⅛-11¼
NORTH LOUISIANA			
58-60 U. S. Motor 437 E. P.	9¼- 9½	- 9¼	9 - 9¼
ARKANSAS			
56-58 450 E. P. gasoline	- 9	- 9	- 8⅞
58-60 450 E. P. gasoline	- 9¼	- 9¼	- 8⅞
58-60 U. S. Motor gasoline	- 9½	9⅜- 9½	- 9
CALIFORNIA			
*54-58 U. S. Motor 437 E. P.	9 - 9½	9 - 9½	9 - 9½
*58-61 U. S. Motor, 437 E. P.	10½-10¾	10½-10¾	10½-10¾
*42-45 Engine distillate,445-480E.P.	7 - 7½	7 - 7½	7 - 7½
*2c tax to be added if used in state.			
NEW ENGLAND (F. O. B. Boston and Fall River)			
58-60 U. S. Motor gasoline	-12⅜	12 -12⅜	-12⅜

NATURAL GASOLINE

(Note: End point of all grades, not over 375° F.)

OKLAHOMA			
Grade AA, 80-87.9 375 E. P.	- 9½	9¼- 9½	- 9¼
Grade A, 72-79.9 375 E. P.	- 9½	9¼- 9½	- 9¼
Grade BB, 84-92, 375 E. P.	- 8¾	8½- 8¾	8½- 8¾
Grade B, 76-83.9, 375 E. P.	- 8¾	8½- 8¾	8½- 8¾
Grade C, 80-90, 375 E. P.	8⅜- 8½	- 8¼	†8 - 8¼
NORTH LOUISIANA			
*Grade Double A	9½- 9¾	9½- 9¾	- 9½
*Grade Double B	9⅜- 9½	9⅜- 9½	- 9
*Grade C	9 - 9¼	9 - 9¼	- 8½
*F. O. B. Monroe District.			
NORTH TEXAS			
*Grade Double A	9¼- 9⅝	- 9½	- 9⅜
*Grade A	9½- 9⅝	- 9½	- 9⅜
*Grade Double B	8⅞- 9	- 8⅞	8¾- 8⅞
*Grade B	8⅞- 9	- 8⅞	8¾- 8⅞
*Grade C	- 8¾	- 8¾	- 8¾
*F. O. B. Breckenridge.			
CALIFORNIA			
75-85, 375-390 E. P. blend	10½-11½	10½-11½	10½-11½
PENNSYLVANIA			
68-70 Grav. 437 E. P. blend	12¼-12½	12¼-12½	12½-12¾
64-66 Grav. 437 E. P. blend	12 -12½	12 -12½	12¼-12½
60-62 Grav. 437 E. P. blend	12 -12½	12 -12½	12¼-12½
68-70 Grav. 420 E. P. blend	12¼-12½	12¼-12½	12½-12¾

BURNING OILS

PENNSYLVANIA			
45 Water White Kerosene	8¼- 8½	8 - 8¼	8¼- 8½
46 Water White Kerosene	8¾- 9	8½- 8¾	8¾- 9
47 Water White Kerosene	9¼- 9½	9 - 9¼	9 - 9½
OKLAHOMA			
41-43 Water White Kerosene	6¼- 6½	6¼- 6½	6¼- 6½
42-44 Water White Kerosene	7 - 7¼	7 - 7¼	- 7
KANSAS			
41-43 w. w. kerosene	6½- 6¾	- 6¾	6¾- 7
42-44 w. w. kerosene	- 7½	- 7½	7½- 7¾
NORTH TEXAS			
40-42 Water White Kerosene	6¼- 6⅜	6¼- 6⅜	6 - 6¼
41-43 Water White Kerosene	6⅜- 6½	6⅜- 6½	6¼- 6⅜
NORTH LOUISIANA			
41-43 Water White Kerosene	- 7¼	7 - 7¼	- 7
ARKANSAS			
41-43 Water White Kerosene	- 7	- 7	- 7
*Quotations Only.			
†Nominal			

CALIFORNIA	Prices Dec. 13	Prices Dec. 6	Prices Nov. 29
38-40 Water White Kerosene	6 - 6½	6 - 6¼	6 - 6¼
NEW ENGLAND			
**40-43 Water White Kerosene	**-10¼	**-10½	**-10½

NEUTRAL OIL

PENNSYLVANIA			
(Viscosity at 70° F.)			
200 Vis. No. 3 Assoc. Filt.	28½-29	28½-29	28½-29
180 Vis. No. 3 Assoc. Filt.	26½-27	-26½	-26½
150 Vis. No. 3 Assoc. Filt.	23½-24	23 -24	23 -23½
(Non-Viscous)			
34 Grav. 350-360 Flash	8 - 8¼	8 - 8¼	7¾- 8¼
36 Miners Neutrals 300-305 Flash	7½- 7¾	7½- 7¾	7¾- 7¾
OKLAHOMA			
(Viscosity at 100° F.)			
100 Vis. No. 2 color	7 - 7½	7 - 7½	7 - 7½
150 Vis. No. 3 color	9 -10	9 -10	9 -10
150 Vis. No. 4 color	- 9¾	- 9¾	- 9¾
180 Vis. No. 3 color	10 -11	10 -11	10 -11
180 Vis No. 4 color	10 -10½	10 -10½	10 -10½
180 Vis. No. 5 color	10 -10½	10 -10½	10 -10¾
200 Vis. No. 3 color	10¾-11¾	10¾-11¾	10¾-11¾
200 Vis. No. 4 color	-11½	-11½	-11½
200 Vis. No. 5 color	9¾-11¼	9¾-11¼	9¾-11¼
220 Vis. No. 3 color	12 -13½	12 -13½	12 -13½
220 Vis. No. 4 color	-13	-13	-13
220 Vis. No. 5 color	12 -12¾	12 -12¾	12 -12¾
240 Vis. No. 3 color	14 -15	14 -15	14 -15
240 Vis. No. 4 color	-14½	-14½	-14½
240 Vis. No. 5 color	13 -14	13 -14	13 -14
280 Vis. No. 3 color	16 -17	16 -17	16 -17
280 Vis. No. 4 color	-16½	-16½	-16½
280 Vis. No. 5 color	15 -16	15 -16	15 -16
300 Vis. No. 5-6 color	-17	-17	-17
GULF COASTAL (Viscosity at 100° F.; cold test 0)			
100 Vis. No. 2 Color Unfilt. Pale	8 - 9	8 - 9	8 - 9
200 Vis. No. 3 Color Unfilt. Pale	11 -12	11 -12	11 -12
300 Vis. No. 3 Color Unfilt. Pale	12 -13	12 -13	12 -13
500 Vis. No. 3½ Color Unfilt Pale	14 -15	14 -15	14 -15
750 Vis. No. 4 Color Unfilt. Pale	17 -18	17 -18	17 -18
200 Vis. No. 5½ Color Red Oil	9 -10	9 -10	9 -10
300 Vis. No. 5½ Color Red Oil	10 -11	10 -11	10 -11
500 Vis. No. 6 Color Red Oil	12 -13	12 -13	12 -13
750 Vis. No. 6 Color Red Oil	15 -16	15 -16	15 -16
CALIFORNIA (Viscosity at 100° F.)			
100 Vis. No. 2 color	9½-10	9½-10	9½-10
100 Vis. No. 3 color	8 - 8½	8 - 8½	8 - 8½
200 Vis. No. 3 color	10 -10½	10 -10½	10 -10½
300 Vis. No. 3 color	11 -11½	11 -11½	11 -11½
450 Vis. No. 3½ color	13 -13½	13 -13½	13 -13½
550 Vis. No. 3½ color	15 -15½	15 -15½	15 -15¾
600 Vis. No. 3½ color	15¾-16	15¾-16	15¾-16
100 Vis. No. 5 color	7 - 7½	7 - 7½	7 - 7½
200 Vis. No. 5 color	9 - 9½	9 - 9½	9 - 9½
300 Vis. No. 5 color	9½-10	9½-10	9½-10
400 Vis. No. 6 color	11½-12	11½-12	11½-12
500 Vis. No. 6 color	12 -12½	12 -12½	12 -12½
600 Vis. No. 6 color	12½-13	12½-13	12½-13
700 Vis. No. 7 color	14½-15	14½-15	14½-15

CYLINDER STOCKS

OKLAHOMA			
190-200 Vis. at 210° Bright Stock	31 -35	31 -35	31 -35
150-160 Vis. at 210° Bright Stock	27 -31	27 -31	27 -31
600 E Stock 140-150 Vis —210°	18 -20	18 -20	18 -20
600 Steam Refined Olive Green	8 -11	8 -11	8 -11
600 Steam Refined Dark Green	5½- 7½	5½- 7½	5½- 7½
Black Oil	5 - 6	5 - 6	5 - 6
PENNSYLVANIA (1-inch Immersion Test)			
600 Steam Refined	11½-12	11 -11½	11 -11½
650 Steam Refined	16 -16½	15½-16	15½-16
600 Flash	20 -21	19½-20½	20 -21
625 Flash	30 -31	-30	-30
600 Warren E	20 -20½	20 -20½	20 -20½
600 Oil City E	19 -19½	18½-19½	18½-19½
600 D Filtered	25½-26	25½-26	25½-26
Cold Test Stocks (bright filtered)	37 -37½	37¾-38½	37¾-38½
Cold Test Stock (dark filtered)	34½-35½	36 -37	36 -37

(Note—Prices of total immersion test goods average 1 to 3 cents per gallon higher.)

LONG RESIDUUM STOCKS

PENNSYLVANIA			
60-65 vis. @ 210, 440-450 flash No. 5½ color	-33	-33	-33
70-75 vis. @ 210, 450-455 flash No. 6 color	-34	-34	-34
80-85 vis. @ 210, 440-450 flash No. 7 color	-35	-35	-35
80-85 vis. @ 210, 450-460 flash No. 7-8 color	-36	-36	-36
80-85 vis. @ 210, 460-465 flash No. 7 color	36 -37	36 -37	36 -37
95-100 vis. @ 210, 490-495 flash No. 8 color	-38	-38	-38

**Only one refiner quotion.

This Type CK 2½-ton Autocar Truck, equipped with a 1000-gallon tank body, is owned by the Dominion Oil Company of Richmond, Va., who have been using Autocar trucks for more than two years in handling their oil deliveries, principally within the City of Richmond. They are now operating a fleet of six 2½-ton Autocar trucks. Five of these Autocars are equipped with tank bodies and one of them with a rack type body.

Autocar performance is a deciding factor

Many companies have decided to purchase their first Autocar as a result of the following investigation: Selecting some names of Autocar users (taken at random from the list published in the Autocar Petroleum Booklet) they wrote the owners, asking for their opinion of Autocar performance.

It is one of the best and most impartial ways of making sure that you are buying the truck that will do your work economically. For haulers of shifting loads of gasoline and oil who use Autocars know from their cost records the economies effected by Autocar sturdiness, Autocar more even weight distribution and the Direct Factory Branch Service behind the truck.

Try this test yourself by writing us for a free copy of "Autocar Trucks and Those Who Use Them for Hauling Gasoline and Oil."

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ESTABLISHED 1897
Ardmore, Pa.

Direct Factory Branches or Affiliated Representatives in 66 cities

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*Allentown
Altoona
*Atlanta
*Atlantic City
*Baltimore
Binghamton
*Boston
*Bronx
*Brooklyn
*Buffalo
*Camden
*Canton, Ohio
*Charlotte
*Chester
*Chicago
*Cleveland
Columbus
Cumberland
*Dallas
Denver
*Detroit
*Erie
*Fall River
*Fresno
Harrisburg
*Indianapolis
*Jersey City
Lancaster
*Lawrence
*Los Angeles
*Memphis
Miami
*Newark
*New Bedford
*New Haven
*New York
*Norfolk
*Oakland
*Paterson
*Philadelphia
*Pittsburgh
*Providence
*Reading
*Richmond
*Rochester
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*San Francisco
*San Jose
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Scranton
Shamokin
*Springfield
*St. Louis
*Stockton
*Tampa
Utica
*Washington
West Palm Beach
Wheeling
Wilkes-Barre
Williamsport
*Wilmington
*Worcester
York

*Indicates Direct Factory Branch

Autocar Trucks

Refinery Markets on Wax and Heavy Oil Products

Pennsylvania, Oklahoma, Kansas, North and South Texas, Louisiana, Arkansas, California and New England

WAX

PENNSYLVANIA	Prices Dec. 13	Prices Dec. 6	Prices Nov. 29
	(Per Pound, New York)		
122-124 White Crude Scale	4¾	4¾ - 5	4¾ - 5
124-126 White Crude Scale.	4¾ - 4⅞	5 - 5⅛	5 - 5⅛
OKLAHOMA			
124-126 White Crude Scale.	4¼ - 4⅜	4⅛ - 4¼	4⅛ - 4¼
CALIFORNIA			
White Crude Scale.....	6 - 7	6 - 7	6 - 7

FUEL OIL

PENNSYLVANIA			
38-40 Fuel Oil.....	6¼ - 6¾	6¼ - 6¾	6¾ - 7
30-34 Fuel Oil.....	6¾ - 6⅞	- 6⅞	- 6⅞
28-30 Fuel Oil.....	6¼ - 6¾	6¾ - 6⅞	6¾ - 6⅞
OKLAHOMA			
38-40 Straw distillate.....	5¼ - 5½	5¼ - 5½	5¼ - 5½
36-38 Straw distillate.....	5 - 5¼	5 - 5¼	5 - 5¼
32-36 Gas oil cracked (Gal.)	4¼ - 4½	4¼ - 4¾	- 4¼
32-36 uncracked Gas oil,(Gal.)	4¼ - 4⅜	4¾ - 4½	4¼ - 4¾
28-30 Fuel oil (Bbl.).....	1.50 -1.60	1.50 -1 60	1.50 -1 60
26-28 Fuel oil (Bbl.).....	1.35 -1 45	1.35 -1.45	1.35 -1.45
24-26 Fuel oil (Bbl.).....	1.27½-1.32½	1.27½-1.32½	1.27½-1.32½
22-26 Fuel oil (Bbl.).....	1.22½-1.27½	1.22½-1.27½	1.22½-1.27½
18-22 Fuel oil (Bbl.).....	1.20 -1.25	1.20 -1.25	1.20 -1.25
16-18 Fuel oil (Bbl.).....	-1.20	-1.20	-1.20
14-16 Fuel oil (Bbl.).....	-1.17½	-1.17½	1.17½-1.20
KANSAS*			
38-40 straw distillate.....	5¾ - 6	5¾ - 6	5¾ - 6
36-38 straw distillate.....	5½ - 5¾	5¾ - 5¾	5¾ - 5¾
32-36 Gas Oil.....	- 4½	- 4½	- 4½
18-22 Fuel Oil.....	1.25 -1.35	1.25 -1.35	1.25 -1.30
24-26 Fuel Oil.....	1.45 -1.55	1.45 -1.55	1.45 -1.55
*F. O. B. refinery, Kansas destination.			
NORTH TEXAS			
38-40 Straw Distillate.....	5 - 5¼	5 - 5¼	5 - 5¼
32-36 Gas Oil (Gal.) cracked	4¼ - 4⅜	4¼ - 4⅜	4¼ - 4¼
32-36 uncracked gas oil....	- 4⅜	4¼ - 4⅜	- 4¼
24-26 Fuel per (Bbl.) 1.52½-1.55		1.52½-1.55	1.55 -1.57½
GULF COASTAL			
Fuel.....1.55 -1.60		1.55 -1.60	1.55 -1.60
Gas Oil.....	5¼ - 5½	5¼ - 5½	5¼ - 5½

NORTH LOUISIANA	Prices Dec. 13	Prices Dec. 6	Prices Nov. 29
32-36 Gas oil, cracked (Gal.)	- 4¾	4⅜ - 4½	4⅜ - 4½
32-36 Gas oil, uncracked(Gal.)	4¾ - 5	4½ - 4⅝	4½ - 4⅝
16-20 Fuel Oil (Bbl.).....	-1.20	1.17½-1.20	1.17½-1.20
ARKANSAS			
30-34 Gas oil.....	- 4¼	- 4¼	4 - 4¼
32-36 Gas oil.....	4½ - 4¾	4½ - 4⅝	4¼ - 4½
Smackover Crude Fuel....1.25	-1.30	1.25 -1.27½	1.22½-1.27½
CALIFORNIA*			
14-18 Fuel Oil (Bbl.).....	80 -1.00	80 -1.00	80 -1.00
14-18 Bunker Oil (Bbl.)...	80 -1.00	80 -1.00	80 -1.00
30-34 Gas Oil (Bbl.).....1.30	-1.35	1.30 -1.35	1.30 -1.35
27 + Diesel Oil (Bbl.)....	-1.15	-1.15	-1.15
*(San Joaquin Valley, San Franciso 4c per bbl. more.)			
NEW ENGLAND			
	(F. O. B. Boston and Fall River)		
30-32 Gas Oil (Gal.).....	6 - 6¼	6 - 6¼	6 - 6¼
Fuel Oil (Bunker C) Bbl..	-1.85	-1.85	-1.85

PETROLATUMS

PENNSYLVANIA			
Snow White.....	8½ - 9	8½ - 9	8½ - 9
Lily White.....	7½ - 8	7½ - 8	7½ - 8
Cream White.....	- 6½	- 6½	- 6½
Light Amber.....	- 5½	- 5½	- 5½
Amber.....	5¼ - 5½	5¼ - 5½	5¼ - 5½
Red.....	- 3	- 3	- 3
Green —5.....	1¾ - 2	1¾ - 2	1¾ - 2

PETROLEUM COKE

OKLAHOMA

(Per ton in car lots)

Lump.....	35-36	35-36	35-36
Breeze.....	2-2.25	2-2.25	2-2.25
Still Run.....	3.25-3.50	3.25-3.50	3.25-3.50

Above prices are f. o. b. refinery in tank car. They are the prices at which the bulk of the products on the open market move. Whoever has knowledge of any open market prices on any considerable quantity of goods differing from the foregoing, will favor us with this information.

(Continued from page 113)

were preparing to change one of their plants over to make the material when they found one source which could help them out.

The domestic demand for kerosene has been light this week, and exporters have shown no interest in the market. Prices have remained unchanged, however, with shipments reported about on an even keel with production.

Distillate demand has been good, a majority of the trade reports. Prices, however, have shown no change this week, although a few buyers reported 38-40 straw distillate harder to obtain at 5¼ cents.

Gas oil demand has picked up considerably within the past few days. Zero cold test material has been extremely scarce in Oklahoma.

Refiners in the Shreveport district make a low flash 32-36 straw colored gas oil with a zero to 10 cold test. A few jobbers have been buying this product and selling it as a 36 gravity distillate, according to reports received here from Chicago. The demand for the product in Louisiana has been unusually heavy and prices are stronger in that district than in any of the others.

Fuel oils have showed no changes in prices during the week. Movement has been fair, a majority of refiners reported. Low cold test material has been in fairly good demand. In Texas the fuel oil market has been softer, due primarily to the fact that more dirty cars are available at present.

Neutrals and cylinder stocks have remained steady. Wax has firmed up slightly within the past few days, prices being around 4¼ to 4⅜ cents now as compared with 4⅜ cents a week ago.

Pennsylvania Products Reported Active

CLEVELAND, Dec. 13.—Western Pennsylvania markets have improved in the last week, refiners report, except demand for bright stocks and waxes. Neutrals have been active and several makers of these light oils report they are sold up.

The decline in bright stocks business is seasonal as less bright stocks and more neutrals are used in winter motor oils. An advance in bright stocks prices is not expected until motor oil blenders begin to buy for their spring requirements after Jan. 1. Long residuum oils are steady with demand good.

Prices of neutrals are fractionally higher than a week ago. Refiners are cautious not to let neutrals prices get out of hand, although a few cars of spot oils are said to have moved at ¼ to ½ cent a gallon above the general market.

Gasoline movement is considered good for the season. Last week some 58-60 U. S. Motor gasoline was sold out of Western Pennsylvania by brokers for a large refiner at 11½ cents but today none of this gasoline could be found and Independent refiners were quoting 11¼ and 12 cents for this grade of motor fuel.

Kerosene is more active at slightly higher price. Fuel oils are scarce and the market is reported to be firmer than a week ago although the price schedule reflects revisions which seemingly indicate a weakening. This, however, is not the case.

Spot buying of waxes is relatively light, but a few refiners are sold up on contracts and are out of the market. Refiners' quotations are more in line with New York prices than they were during more of the fall.

Correction

In the Dec. 6 column of prices in the refinery market table of the Dec. 8 issue the price of North Louisiana 41-43 w.w. kerosene was published erroneously at 7 cents flat. Price should have been 7 to 7¼ cents on Dec. 6.

Gas Oil and High Test Gasoline Strong in Chicago Market

CHICAGO, Dec. 11

GAS oil was in good demand this week in the Chicago resale market, especially for zero cold test straw material from the jobbing trade. Material became scarcer as the week progressed and more difficult to obtain from the field.

Industrial gas oil consumption was following the usual December trend, the trade reported. November purchases had been made with the yearly inventories in mind, it was pointed out, and there would be no large buying from this quarter until the first of the year. A fair volume of business, however, was done with the large industrials this week to supply current demand which, coupled with the home burning consumption and small industrial trade, gave the market a good tone.

The good demand was reflected in prices which were on the upward trend through the week. Sales Monday of the 32-36 straw gas oil were made at 4⅜ to 4⅝ cents. Wednesday the price went to 4½ to 4⅞ cents, Thursday to 4⅝ to 4⅞ cents, and closed the week at 4¾ to 4⅞ cents. The higher price was for zero cold test material. One large refiner today advanced his quotation to 5⅛ cents. Dark gas oil, 32-36 gravity, also closed the week stronger at 4⅜ to 4⅝ cents after opening Monday at 4¼ to 4⅜ cents. Prices advanced Wednesday to 4¼ to 4⅝ cents, the latter price for cold test stocks, and again Thursday to 4⅜ to 4⅝ cents.

High test gasolines came through with demand steady and volume of business reported as being on a par with that of the week previous, although there has been no large buying by jobbers. As with gas oils, the high test prices showed a steady advance. The market Monday for 64-66, 375 e.p. material was 10¾ to 10⅞ cents, with 11 cent material being sold beginning Tuesday. Bottom of the market moved to 10⅞ cents Wednesday and the top advanced an eigth of a cent today to 11⅛ cents. The 60-62, 400 e.p. gasoline went from a flat price of 10¼ cents Monday to 10¼ to 10⅜ cents Tuesday, and Thursday to a range of 10¼ to 10½ cents. One Oklahoma refiner today advanced his quotation on 64-66 375 e.p. gasoline to 11¼ cents and on 60-62, 400 e.p. stock to 10¾ cents.

Demand for 58-60 U. S. Motor gasoline over the week was reported as being slow. One Oklahoma refiner, however, said his business this week was better than last week, and a carload marketer reported business a trifle better. On the other hand another larger refiner said U. S. Motor business has slowed up this week and inquiries were fewer, while other sellers reported demand slow.

A full quarter of a cent advance was made by U. S. Motor material. Monday sales were made at 9 to 9¼ cents. Tuesday the lower priced material was off the market while some 9½ cent sales were being recorded and the market was 9⅛ to 9¼ cents. The market moved to a level of 9⅛ to 9½ cents Wednesday and the low price firmed at 9¼ cents today with the top of the market stationary at 9½ cents.

Distillates were steady over the week, but not as active as the gas oils. The 38-40 straw distillate price was firm at 5⅜ to 5½ cents, with low flash material more in demand and commanding the higher price; 36-38 distillate was pegged at 5¼ cents.

Kerosenes were slow and unchanged. The refiner who reported a good demand for material in Michigan last week, and filling the orders from an Ohio plant, said that demand held up over the current week. The 41-43 w.w. kerosene price ranged from 6¼ to 6½ cents, with bulk of material moved at 6⅜ cents. Two refiners were behind in orders and were taking on some business at 6½ cents, and a carload marketer reported business at this figure.

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OILGRAM
Petroleum Markets-Every Day

HOW SURE ARE YOU?

If you were to place an order *today* for gasoline, or kerosene, or fuel oil, or lubricating oil—

How sure would you be that you were buying *at the right time* and *at the actual market?*

Did you hear of a tankwagon cut today in another territory, which might indicate a cut coming in yours? Or, did crude change today? Or, did some one put in a big buying order for export which will stiffen the gasoline market ¼ cent or so tomorrow?

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Eastern Gasoline Demand Falls With Big Snow

NEW YORK, Dec. 13.—Consumption of gasoline suffered a sharp decline last week as a result of a heavy snow. Prices were steady, due to the lighter receipts from California. U. S. Motor in cargo lots is being laid down here at 11¼ cents a gallon but tankers are still scarce and marine rates are high. New York factors do not look for any marked declines during the immediate future. Much of the California gasoline arriving has been sold already.

Improvement in the tone of the Gulf market has tended to offset the slump in jobbing demand here. Competition among refiners is not so keen as expected and U. S. Motor in tank cars at the refineries is held at 11½ cents a gallon, and in tank cars delivered to the trade at 12½ cents a gallon.

Upstate buyers are purchasing just enough to cover nearby requirements. Stocks are moderate and refiners are confident there will be a good export movement soon.

Gulf refiners are firmer in their ideas, and are asking 11 cents for U. S. Motor, in tank cars at the refineries although business could have been done in one direction at 10¾ cents a gallon.

Motor Benzol is Steady

NEW YORK, Dec. 13.—Motor benzol was quiet last week. Production of coke is steady but not large and consequently supplies of motor benzol have failed to pile up. Marketers say no change is looked for for some time unless an unforseen reduction in gasoline prices occurs. At the ovens, motor benzol in tank cars is offered at 23 cents a gallon. Export inquiries for motor benzol have been more numerous but no sales have been reported. Stocks on hand are moderate.

Eastern and Central Kentucky Market

ASHLAND AND LEXINGTON, Dec. 13.—High gravity gasolines in the eastern refinery market are from ⅛ to ⅜ cent higher than last Monday, while U. S. motor and gravity 60-62 gravity gasolines are steady at unchanged prices. Kerosene and 24-26 fuel oil are down ¼ cent and ⅛ cent respectively. All other products are unchanged in price.

Demand is fair for all commodities in the central Kentucky market, and all prices are unchanged over previous week, except kerosene which is down ⅛ cent.

December 13 quotations are:

	Eastern	Central
58-60 gasoline	11¾	11¼
60-62 gasoline	12¼	
64-66 gasoline	13	
68-70 gasoline	13¾	
41-43 w.w. kerosene	7¾	8¼
36-38 distillate	6½	
34-36 gas oil	6	6
24-26 fuel oil	4⅞	
23-25 fuel oil	5	
14-16 fuel oil	4⅝	5

Tank Wagon, Service Station Markets for Gasoline and Kerosene In United States Territories and Canada

These Prices in Effect Dec. 13, 1926

S. O. NEW JERSEY TERRITORY

	Gasoline T.W.	Tax	Total T.W.	S.S.	Oil T.W.
Atlantic City, N. J.	18	0	18	*	16
Newark, N. J.	18	0	18	20	16
Annapolis, Md.	18	2	20	*	16
Baltimore, Md.	18	2	20	23	16
Cumberland, Md.	18	2	20	23	16
Washington, D. C.	18	2	20	23	16
Danville, Va.	18	4½	22.5	*	16
Norfolk, Va.	18	4½	22.5	25.5	16
Richmond, Va.	18	4½	22.5	25.5	16
Roanoke, Va.	18	4½	22.5	25.5	16
Petersburg, Va.	18	4½	22.5	*	16
Williamsburg, Va.	18	4½	22.5	*	16
Charleston, W. Va.	18	3½	21.5	24.5	16
Clarksburg, W. Va.	18	3½	21.5	24.5	16
Keyser, W. Va.	18	3½	21.5	*	16
Parkersburg, W. Va.	18	3½	21.5	24.5	16
Wheeling, W. Va.	18	3½	21.5	24.5	16
Charlotte, N. C.	19	4	23	26	16
Hickory, N. C.	19	4	23	*	16
High Point, N. C.	19	4	23	*	16
Mt. Airy, N. C.	19	4	23	*	16
Salisbury, N. C.	19	4	23	*	16
Charleston, S. C.	19	5	24	27	16
Columbia, S. C.	19	5	24	27	16

*Dealers set own prices. S. O. New Jersey does not operate station.

S. O. NEW YORK

Due to local price conditions at many points in S. O. New York territory, actual prices on both gasoline and kerosene are being made at under the posted tank wagon prices published below.

*New York City	21	0	21	25	18
Albany, N. Y.	17	0	17	19	18
Buffalo, N. Y.	17	0	17	20	18
Rochester, N. Y.	17	0	17	21	16
Syracuse, N. Y.	17	0	17	19	18
Boston, Mass.	19	0	19	21	18
Augusta, Me.	21	3	24	26	18
Manchester, N. H.	21	2	23	25	18
Burlington, Vt.	20	2	22	24	18

*In steel barrels.

ATLANTIC REFINING

Pittsburgh, Pa.	18	*	18	*23	16
Philadelphia, Pa.	18	*	18	*23	16
Allentown, Pa.	18	*	18	*23	16
Erie, Pa.	18	*	18	*23	16
Scranton, Pa.	18	*	18	*23	16
Altoona, Pa.	18	*	18	*23	16
Dover, Del.	18	2	20	23	16
Wilmington, Del.	18	2	20	23	16
Providence, R. I.	19	1	20	22	18
Boston, Mass.	19	0	19	21	18
Springfield, Mass.	19	0	19	21	18
Worcester, Mass.	19	0	19	21	18
Hartford, Conn.	19	2	21	24	17
New Haven, Conn.	19	2	21	24	18

*2-cent state tax is collected by retail dealer and paid by him directly to state.

S. O. KENTUCKY

Lexington, Ky.	18	5	23	26	17
Louisville, Ky.	17	5	22	25	17
Covington, Ky.	18	5	23	26	17
Clarksdale, Miss.	16	4	20	23	14.5
Gulfport, Miss.	††17.5	4	††21.5	24.5	15
Jackson, Miss.	16	4	20	23	15.5
Natchez, Miss.	15.5	4	19.5	22.5	15
Vicksburg, Miss.	15.5	4	19.5	22.5	15
Birmingham, Ala.	16	2	18	21	17.5
Mobile, Ala.	15	2	17	20	16
Montgomery, Ala.	*17	2	19	22	*18.5
Atlanta, Ga.	†14	3½	18	21	18
Augusta, Ga.	†14	3½	18	21	17
Macon, Ga.	†14	3½	18	21	18
Savannah, Ga.	†14	3½	18	20	16
Jacksonville, Fla.	12	4	16	19	16
Miami, Fla.	14	4	18	21	17.5
Tampa, Fla.	12	4	16	19	16
Pensacola, Fla.	**13	4	**17	20	16.5

*Local privilege tax of 1 cent on gasoline and ½ cent on kerosene at Montgomery included.

†Georgia has ½ cent per gal. inspection fee on gasoline which is deducted as well as the state gasoline road tax of 3½ cents, to get the actual net tank wagon market to dealer.

**Both tank wagon prices include 1c city tax at Pensacola, which went into effect Oct. 15, 1926.

††Both tank wagon prices at Gulfport include special Sea Wall tax of 2c.

S. O. INDIANA

	Gasoline T.W.	Tax	Total T.W.	S.S.	Oil T.W.
Chicago, Ill.	†18	0	†18	20	13.5
Decatur, Ill.	18.2	0	18.2	20.2	14
E. St. Louis, Ill.	17.1	0	17.1	19.35	13.1
Joliet, Ill.	18.4	0	18.4	20.4	14.2
Peoria, Ill.	18.2	0	18.2	20.2	14
Quincy, Ill.	18.2	0	18.2	20.2	13.8
Indianapolis, Ind.	18.2	3	21.2	23.2	14.2
Evansville, Ind.	18	3	21	23	14
South Bend, Ind.	18.4	3	21.4	23.4	14.4
Detroit, Mich.	18.8	2	20.8	22.8	14 7
Grand Rapids, Mich.	18.7	2	20.7	22.7	14 6
Saginaw, Mich.	18.9	2	20.9	22.9	14.8
Green Bay, Wis.	18.6	2	20.6	22.6	14.3
Madison, Wis.	18 3	2	20.3	22.3	14
Milwaukee, Wis.	18.1	2	20.1	22.1	13.8
La Crosse, Wis.	19.2	2	21.2	23.2	14.9
Minneapolis, Minn.	15.2	2	17.2	19.2	15.1
Duluth, Minn.	19.5	2	21.5	23.5	15.1
Mankato, Minn.	19.1	2	21.1	23.1	14.9
Des Moines, Iowa	16	2	18	20	14 4
Davenport, Iowa	18.5	2	20.5	22.5	14.4
Sioux City, Iowa	16.9	2	18.9	20.9	14
Mason City, Ia.	18.5	2	20.5	22.5	14 4
St. Louis, Mo.	*17.6	2	19 6	21.9	13.5
Kansas City, Mo.	††18.9	2	20 9	22.9	12.8
St. Joseph, Mo.	††18.5	2	20.5	22.5	13.4
Fargo, N. D.	20.9	2	22.9	24.9	17.1
Grand Forks, N. D.	20	2	22	24	17.4
Minot, N. D.	20.9	2	22.9	24.9	17.1
Pierre, S. D.	19.5	3	22.5	24.5	15 6
Huron, S. D.	19 5	3	22.5	24.5	15.6
Wichita, Kans.	**16.8	2	18.8	20.8	13.3
Bartlesville, Okla.	16.8	3	19.8	21.8	13.3

†Dumps of 100 or more gallons at 17c per gallon

*Includes city tax of ½c.

††Includes city tax of 1c.

**Dumps of 50 gallons or more in Kansas, 1c discount per gallon.

S. O. NEBRASKA

Crawford, Neb.	19	2	21	*	14.75
Omaha, Neb.	18.25	2	20.25	22.25	14
McCook	19.75	2	21.75	23.75	15.5
Norfolk	17	2	19	21	14.5
North Platte	19.75	2	21.75	23.75	15.25
Scottsbluff	19.25	2	21.25	23.25	14.75

*Standard has no service station here.

CONTINENTAL OIL

Denver, Colo.	18	2	20	21	16
Pueblo, Colo.	17	2	19	21	16
Grand Junction, Colo.	21.5	2	23.5	25.5	19.5
Casper, Wyo.	18	2½	20.5	22.5	14.5
Cheyenne, Wyo.	19	2½	21.5	23.5	16
Butte, Mont.	19	2	21	21	19.5
Helena, Mont.	22	2	24	26	19.5
Salt Lake City, Utah.	20.5	3½	24	26	18
Boise, Ida.	22	3	25	27	20
Twin Falls, Ida.	22	3	25	27	20
Albuquerque, N. M.	20	3	23	26	18.5

S. O. CALIFORNIA

Phoenix, Ariz.	19	3	22	25	21.5
Los Angeles, Cal.	11 5	2	13 5	16.5	15.5
Fresno, Cal.	12.5	2	14.5	17.5	16.5
San Francisco, Cal.	13	2	15	18	15.5
Reno, Nev.	16.5	4	20.5	23.5	19
Portland, Ore.	13	3	16	19	16.5
Seattle, Wash.	13	2	15	18	16.5
Spokane, Wash.	17	2	19	22	20.5
Tacoma, Wash.	13	2	15	18	16.5

S. O. LOUISIANA

Little Rock, Ark.	17	4	21	24	16
Alexandria, La.	17	2	19	22	17
Baton Rouge, La.	16	2	18	21	15.5
Lake Charles, La.	17 5	2	19 5	22.5	17
New Orleans, La.	*16.5	2	18.5	21.5	16
Shreveport, La.	16	2	18	21	16
Lafayette, La.	17	2	19	22	16.5
Bristol, Tenn.	20	3	23	26	17.5
Chattanooga, Tenn.	19.5	3	22.5	25.5	17.5
Knoxville, Tenn.	19.5	3	22.5	25.5	18
Nashville, Tenn.	18	3	21	24	18
Memphis, Tenn.	17	3	20	23	17

*Includes 1c city tax on gasoline and kerosene.

S. O. OHIO

	Gasoline T.W.	Tax	Total T.W.	S.S.	Oil T.W.
All Ohio points	19	2	21	23	17

MAGNOLIA PETROLEUM

Muskogee, Okla.	16	3	19	22	13
Oklahoma City	15	3	18	21	13
Tulsa, Okla.	16	3	19	22	13
Fort Smith, Ark.	17	4	21	24	14.5
Little Rock, Ark.	17	4	21	24	14.9
Texarkana, Ark.	†19	4	†*23	†*23	15
Dallas, Tex.	†16	1	†17	†17	15
Fort Worth, Tex.	†16	1	†17	†17	15
Houston, Tex.	†18	1	†19	†19	15
San Antonio, Tex.	†18	1	†19	†19	14
El Paso, Tex.	**19	1	**20	**20	16

*Within city of Texarkana, Ark., the state tax on gasoline is 1c per gal. conforming with the Texas state tax. In Texarkana district outside of the city the 4c state tax applies.

†3c per gal. discount to dealers.

**2c per gal. discount to dealers.

V. M. & P. NAPHTHA

(Changes ordinarily occur coincident with gasoline price changes)

	Oleum Spirits	V.M.& P Naphtha	Cleaner Naphtha
Chicago	21	23	21
Detroit	22.2	24.7	22.7
Kansas City	21.2	23.2	21.2
Milwaukee	21.2	*25.7	*23.7
Minneapolis	*24.5	*27	*25
St. Louis	20.4	22.9	22.2
New York	...	22	....

*Includes 2c state tax.

CANADA

(Per Imperial Gallon, which is 1.2 American Gallons)

ONTARIO

	Gasoline T.W.	Tax	Total T.W.	S.S.	Oil T.W.
Toronto	24.5	3	27.5	31	24
Ottawa	24.5	3	27.5	31	24
Cochrane	28.5	3	31.5	40	29
Ft. William	24.5	3	27.5	32	26.5

MANITOBA

Winnipeg	27.5	3	30.5	34	26.5

SASKATCHEWAN

Regina	30.5	0	30.5	35	29.5

ALBERTA

Edmonton	29.5	2	31.5	35	28.5
Calgary	27.5	2	29.5	33	26.5

BRITISH COLUMBIA

Vancouver	21	3	24	28	23

QUEBEC

Montreal	24.5	3	27.5	31	24
Quebec City	26.5	3	29.5	33	26
Three Rivers	26.5	3	29.5	33	26

NEW BRUNSWICK

St. John	27.5	3	30.5	35	27
Moncton	27.5	3	30.5	35	27

NOVA SCOTIA

Halifax	27.5	3	30.5	35	27
Sydney	29.5	3	32.5	37	29

PRINCE EDWARD ISLAND

Charlottetown	27.5	3	30.5	34	27

Note: In districts surrounding these points 1c additional is added to city price.

Market Section

Cased Gasoline Price Advanced; Export Inquiries Increase

By Special Correspondent
NEW YORK, Dec. 13

LAST week saw an improvement in export demand for major petroleum products. Europeans are buying their early spring requirements. As a result bulk gasoline was advanced at the Gulf, while cased gasoline was advanced ¼ cent a gallon at New York and the Gulf.

Two bulk cargo sales were reported. There were inquiries in the market for six cargoes of gasoline and kerosene mostly from French buyers.

Export Gasoline—New York

The Standard Oil Co., New Jersey advanced cased gasoline ¼ cent a gallon Dec. 9. U. S. Motor is now held at 27.65 cents a gallon. It is reported a leading refiner has booked an order for 50,000 cases of U. S. Motor gasoline for January shipment to the Near East.

Bulk gasoline showed little change. Most of the export orders are being booked by the Gulf companies. U. S. Motor was still quoted at 11½ cents a gallon at New York Harbor refineries. Stocks of gasoline are large owing to the recent arrivals from California, but no further price shading has been reported.

Export Gasoline—Gulf Ports

Gulf gasoline export markets were more active than for some time. A leading Independent refiner booked an order from a Paris concern for 56,000-barrels of U. S. Motor gasoline at 10¾ cents a gallon; 64-66 375 end point gasoline at 12½ cents, and prime white kerosene at 8 cents a gallon. It is expected that at least four of the six cargo inquiries will be booked by the middle of this week.

Gasoline has strengthened considerably. Leading refiners are asking 11 cents for U. S. Motor; 11¼ cents for 60-62 400 e. p.; 11¾ cents for 61-63 390 e. p., and 12¾ cents for 64-66 375 e. p. gasoline.

Cased gasoline is higher in sympathy with New York. U. S. Motor in cases is held at $2.15 a case and 64-66 $2.35 a case, in cargo lots. A large Independent sold 35,000 cases of U. S. Motor and 64-66 375 e. p. for nearby shipment to the Far East.

Domestic Gasoline—Gulf Ports

Jobbing demand for motor gasoline was more spirited, and prices were firmer. Leading refiners are asking 11 cents a gallon for U. S. Motor at the refinery and 12 cents a gallon delivered to nearby points. Stocks are fairly large but in firm hands. Most refiners are confident of the future because of the improved Continental demand.

Export Kerosene—New York

Export demand for kerosene is a trifle more active but most of the buying reported was for small lots. Continental consumers are fairly well covered for the present because of heavy buying late last summer and early fall. Water white was quoted at 9½ cents a gallon at New York harbor refineries. Prime white was offered at 9¼ cents a gallon at refineries. Demand for cased kerosene was more spirited. A Chinese buyer is reported to have purchased 25,000 cases for January—forward shipment, but details were not made known.

Export Kerosene—Gulf Ports

Kerosene prices were steady and unchanged. Export demand has improved slightly. Water white was offered at 9½ cents a gallon with reports current that on a firm bid 9¼ cents could still have been done. Prime white was steady at 8 cents a gallon. Cased kerosene was in better demand. A leading Independent sold 30,000 cases for nearby shipment to the Levant. Prime white in cases was quoted at $1.75 a case and water white $1.85 in cargo lots.

Domestic Kerosene

Domestic demand for kerosene has improved considerably. Stocks at Atlantic Seaboard terminals, however, were large. Prime white was freely offered at 9¼ cents a gallon at the refineries and 10¼ cents delivered. Water white was quoted at 9½ cents a gallon at the refineries and 10½ cents delivered. Jobbers are buying more. In the Gulf markets water white was quoted at 9¼ cents a gallon in tank cars at the refineries. Southern jobbers demand was also more active.

Lubricants—New York

Pennsylvania cylinder stocks were in better demand, but no price changes were announced. Most buying was for domestic account. Export buying has been spasmodic. French buyers are showing more interest but are content with purchasing a few hundred barrels here and there. Prices were steady. Pennsylvania 600 steam refined in barrels, New York, was quoted at 18 cents a gallon. Neutral oils were in good domestic demand.

Lubricants—Gulf Ports

There was a persistent report that a leading Independent refiner has sold a cargo of 35,000 barrels of assorted lubricating oils for January shipment to a French buyer. This report was not confirmed. Export inquiries were more numerous but actual orders were scarce. Consumption of zero cold test oils has shown a large gain. Stocks of these oils are firmly held.

Wax Market—New York

Demand for white crude scale wax was slightly more active at the end of the week. Big Continetal buyers appear more inclined to buy ahead. Underlying conditions have improved regardless of slightly lower prices for one or two grades. French and British manufacturers were credited with several purchases. Most of these orders were for from 50 to 100 tons for nearby shipment. The asking price for both 122-124 and 124-126 A.m.p. white crude scale was 4¾ cents a pound. For 123-125 yellow crude scale the price was 4⅝ cents a pound.

Wax Market—Gulf Ports

Gulf refiners reported improvement in the export demand for white crude scale. Orders mainly were for from 25 to 100 tons but the aggregate turnover was much larger in the preceding week. All of the large Catholic countries are buying more heavily. Saturday 124-126 A.m.p. white crude scale and semi-refined 124-126 A.m.p. were offered at 4½ cents. Fully refined waxes were quoted as follows; 123-125 5½ cents; 125-127 5½; 128-130 5⅝; 133-135 6⅛, and 135-137 6⅜ cents.

Bunker Oil—New York

Bunker oil was firm at $1.75 a barrel at New York refineries and $1.81½ a barrel f.a.s. New York harbor. Domestic consumption is increasing but no export orders were reported. Stocks on hand are firmly held and there have been rumors of impending advances. Most of the oil being delivered is against contracts. Diesel oil demand is less spirited and leading New York refiners are offering at $2.40 a barrel.

Bunker Oil—Gulf Ports

Export buyers showed little interest in bunker oil, at New Orleans. Grade C. is quoted at $1.60 a barrel f.o.b. for bunkering purposes, and $1.45 a barrel in cargo lots. At Tampico grade C for bunkering was offered at $1.55 a barrel; cargoes were scarce but steady at $1.45 a barrel taxes included. A 50,000-barrel cargo of heavy Panuco crude oil is re-

ported to have been sold to a United States buyer at a delivered price figured the equivalent of $1.25 a barrel f.o.b. Tampico taxes to be added.

Gas Oil—New York

Gas oil market has been slightly easier the last few days but prices were unchanged. Refiners were generally quoting 36-40 at 6¼ cents a gallon, and 28-34 at 5¾ cents a gallon at refineries. Export demand has been disappointing. Most of the foreign orders have been for a few hundred barrels for prompt shipment. Domestic demand has become steadier but is not so large as expected.

Gas Oil—Gulf Ports

It was rumored a cargo of 45,000 barrels of light gas oil had been sold to a Continental buyer at 5⅛ cents, but confirmation was lacking. Export demand has been light. Domestic buyers have been operating on a larger scale and prices were steady. For 32 plus dark gas oil the price was 4⅞ cents a gallon. The 26-28 light was quoted at 5⅛ cents with reports current that 5 cents could have been done. Europeans are buying large quantities of Galician oil, owing to the more favorable terms.

West Coast Shipments Are Made Public

LOS ANGELES, Dec. 13.—The San Francisco office of the Bureau of Mines in its October report for California started the publication of shipments of petroleum and petroleum products out of the Pacific Coast territory, co-operating with the California office of the American Petroleum Institute. Heretofore, it has been almost impossible to get a line on shipments out of the San Francisco district, although the movement out of Los Angeles Harbor have been available.

The new report covers only cargo shipments, but it is stated that package shipments will be covered in the annual report, which also will give the total movement, by months, for 1926. This new report will be of great interest to oil men of the country, especially as it is to be published monthly.

According to the first report, the daily average movement in tankers out of Pacific Coast territory during October in barrels was as follows: crude, 34,949; fuel, 107,223; gas oil, 9657; diesol, 8871; tops, 2292; gasoline, 47,071; kerosene, 20,475; lubricants, 3303; total daily average all products, 233,841 barrels.

Movement of products along the Pacific Coast in the Pacific Coast trade territory are not taken into consideration, and the other movements include shipments to Atlantic and Gulf domestic points, Pacific and Atlantic foreign points, in addition to Alaska and Hawaii and Canal Zone.

Bunker oils are not included in the report.

Complete Export Markets

New York Export Market

GASOLINE	Dec. 13	Dec. 6
U. S. Motor Tank cars Ref.	11½	-11½
U. S. Motor cases	27.65	-27.4
California grade U. S. Motor F. O. B. N. Y. Cargoes	11¼	-11¼
KEROSENE		
43-43-150W.W.Tank cars Ref.	09½	-09¾
43-45-150W.W.Cases	19.65	-19.65
42-44-110S.W.Cases	19.15	-19.15
GAS OIL		
36-40, Bulk Refinery	-06¼	-06¼
28-34, Bulk Refinery	-05¾	-05¾
MEXICAN BUNKER OIL		
Grade C. f. o. b. ref. Bulk	-1.75	-1.75
Diesel Oil f. o. b. ref. Bulk	-2.40	-2.50

LUBRICATING OILS

The following prices are cooperage basis f. o. b. New York, products being manufactured by inland refineries.

CYLINDER OILS (Bbls.)

1 inch Immersion Test; All Penna. Products

Filtered D 600	28	-27
Filtered E 600	27	-26
Unfiltered 600 s. r.	18	-18
Unfiltered 650 s. r.	23½	-23½
600 Fash s. r.	24	-25
630 Flash	34	-34

RED PARAFFIN (Bbls.)

(Viscosity at 70)

300 vis.	No. 5 color 21	-21
250 vis.	No. 5 color 20	-20
High Viscosity	No. 5 color 25	-25

NEUTRAL OILS (Bbls.)

(Viscosity at 70)

200 vis. at F.Pale	No. 3 color -31	-31
180 Pale	No. 3 color -29	-29
150 Pale	No. 3 color -24½	-24½

BLACK OIL (Bbls.)

25-30 cold test	13½	-13½
15 cold test	14½	-14½

MEDICINAL OILS

(Includes Price of Drums)
(Penna. Stocks)

	Dec. 13	Dec. 6
Domestic 875-885 s. g.	- .85	- .85
Domestic 865-.870 s. g.	.75- .80	.75- .80
Russian 885-.890 s. g. 325-330 vis.	1.00-1.10	1.00-1.10

WAXES

(Penna. Stocks)
(In Cents per Pound, F. A. S. Carload Lots)

WHITE CRUDE SCALE (Shipped in Bbls.)

122-124 A. m. p.	-04¾	-04⅞
124-126 A. m. p.	-04¾	-04⅞

MATCH

105-108 A. m. p.	-05¾	-05¾

FULLY REFINED (Shipped in Canvas Bags)

120-122 A. m. p.	-05¾	-05¾
123-125 A. m. p. Philadelphia.	-05¾	-05¾
125-127 A. m. p.	-05¾	-05¾
128-130 A. m. p.	-05¾	-05¾
130-132 A. m. p.	-06¾	-06¾
133-135 A. m. p.	-06¾	-06¼
135-137 A. m. p.	-06½	-06¾

YELLOW CRUDE SCALE

124-126 A. m. p.	-04¾	-04¾

PETROLATUMS

(Penna. Stocks)
Per Pound

Dark Green	02½	02½
Veterinary	03	03
Light Amber	03¾	03¾
Dark Amber	03½	03½
Cream	06½	06½
Lily White	08¾	08¾
Snow White	09¼	09¾

Gulf Export Market

GASOLINE
F. O. B. Seaboard
(Shipments of 20,000 Bbls. and over)

	Dec. 13	Dec. 6
U. S. Motor, Bulk	-11	-.10
60-62 400 e. p. Bulk	-11¼	-.11
61-63 390 e. p. Bulk	-11¾	-.11¾
64-66 375 e. p. Bulk	-12¾	-.12
U. S. Motor, Cases (cargo lots	2.15	2.05
64-66 Cases (cargo lots)	2.35	2.25
KEROSENE		
Water White, 43-45 bulk	09½	-09½
Prime White, 41-43 Bulk	08	-08
Water White, cases (cargo lots)	1.85	1.85
Prime White, cases (cargo lots)	1.75	1.75
DOMESTIC GAS AND BUNKER OIL		
26-28, gravity, Bulk*	.05 -05¾	-05
32 plus, bulk, Dark	04¾	-04¾
Grade C, Bunker oil	1.60	-1.60
Cargoes	1.45	-1.45

*Translucent through neck of a 4 oz. bottle.

MEXICAN CRUDE AND BUNKER OILS
F. O. B. Steamer Tampico

Heavy, Panuco crude Taxes to be added	1.25	-1.25
Grade C, Bunker oil Taxes paid cargoes	1.40	nominal
Grade C, Bunker oil, F. O. B. Tampico, For Bunkering Purposes, taxes paid	1.55	-1.55

SOUTH TEXAS
(Viscosity at 100° F; cold test 0)
(Tanker, F. O. B. Houston)

*LUBRICATING OILS	Dec. 13	Dec. 6
100 Vis. No. 2 Unfiltered Pale	08¾	08¾
150 Vis. No. 2½ Unfiltered Pale	10¼	10¾
200 Vis. No. 3 Unfiltered Pale	11	11
300 Vis. No. 3 Unfiltered Pale	12¾	12¾
500 Vis. No. 3½ Unfiltered Pale	14	14
200 Vis. No. 5½ Red Oil	10	10¾
300 Vis. No. 5½ Red Oil	11	10¾
500 Vis. No. 6 Red Oil	12	11½
800 Vis. No. 6 Red Oil	16	16

*These prices are entirely nominal owing to wide fluctuations.

Pacific Export Market

(Cargo lots quotations at seaboard, Los Angles Gravity test on A. P. I. scale)

	Dec. 13	Dec. 6
Gasoline, U. S. Motor— 54°-56°	8½- 9	08½- 9
Gasoline, U. S. Motor— blends and special cuts	9¼-10	9¼-10
Gas Oil, 30°—34° per bbl.	$1.30-1.35	1.30-1.35
Diesel Oil, 27°—plus per bbl.	$1.00-1.15	1.00-1.15
Bunker Oil, 14°—18° bbls.	$ .80-1.00	.80-1.00
Fuel Oil, 14°—18° per bbl.	$ .80-1.00	.80-1.00
Kerosene, W. W. 38°—40° per gal., 125-150 flash test	.05½-06	.05½- .06
Cased Goods		
Gasoline, U. S. Motor	$2.25	-2.25
Kerosene, W. W. 38°—40° per case, 125-150 flash	$1.45-1.55	$1.45-1.55

N. Y. Domestic Market

The following light oil, gas and fuel oil prices are F. O. B. New York refineries, being products made from Domestic (including California) and Mexican Crudes.

	Dec. 13	Dec. 6
U. S. Motor Gasoline, Tank Cars Delivered greater N.Y.	-12½	-12½
U. S. Motor Gasoline, Tank Cars Bayonne	-11½	-11½
U. S. Motor Tank Cars, *Atlantic Seaboard Terminals.	-11½	-11½
Kerosene, 44 150 W. W. Tank Cars de'd greater N.Y.	-10½	-10¾
Grade C Bunker f.o.b. N.Y. Ref	-1.75	-1.75
Diesel Oil f.o.b. Refinery	2.40	2.50
Gas Oil, 36-40, Bulk Refinery..	-06¼	-06¼
Gas Oil, 28-34, Bulk Refinery..	-05¾	-05¾

*New York, Philadelphia, Portsmouth, Va., Charleston, S. C.

Crude Oil Prices, as Posted by Major

EASTERN FIELDS

(Posted by Joseph Seep Purchasing Agency)

Penna. Grade Oil in New York Transit Lines (Alleghany, N. Y. District)	$3.15
Bradford District Oil in National Transit Lines (Bradford District)	3.15
Penna. Grade Oil in National Transit Lines (Other Pennsylvania)	3.05
Penna. Grade Oil in Southwest Penna. Pipe Lines (Other Pennsylvania)	3.05
Penna. Grade Oil in Eureka Pipe Lines (West Virginia)	3.00
Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O. district)	2.80
Keister Grade in National Transit Lines (Butler Co.)	1.80
Cabell Grade in Eureka Pipe Lines (West Virginia)	2.10
Corning Grade in Buckeye Pipe Lines (Ohio)	2.25
Corning, O. heavy grade	2.15
*Somerset Medium in Cumberland Pipe Lines (Kentucky)	2.20
*Somerset Light in Cumberland Pipe Lines (Kentucky)	2.35
Ragland Grade in Cumberland Pipe Lines (Kentucky)	.95

*Somerset oil run prior to Oct. 1, 1923, takes price of 6 cents lower than above quotations.

(Posted by Stoll Oil Refining Co.)

Oil City Ky. oil in Stoll lines.....$2.35

CENTRAL STATES FIELDS

Posted by Ohio Oil Co.

Wooster	$2.25	Plymouth	$1.68
Lima	2.21	WesternKentucky	1.88
Waterloo	1.35	*Canadian Petrolia	2.61
Indiana	1.98	*Oil Springs	2.68
Princeton	2.10	*Posted by Imperial Oil Ltd.	
Illinois	2.10		

OKLAHOMA, KANSAS And NORTH TEXAS

Prices of Prairie Oil & Gas Co.
(In Oklahoma, Kansas, North and East Central Texas)

Effective Nov 17, 1926.

28-28.9	$1.50	34-34.9	$1.80
29-29.9	1.55	35-35.9	1.85
30-30.9	1 60	36-36.9	1.90
31-31.9	1.65	37-37.9	1.95
32-32.9	1.70	38-38.9	2.00
33-33.9	1.75	39-39.9	2.05
40-40.9	$2.10	47-47.9	$2.45
41-41.9	2.15	48-48.9	2.50
42-42.9	2.20	49-49.9	2.55
43-43.9	2.25	50-50.9	2.60
44-44.9	2.30	51-51.9	2.65
45-45.9	2.35	52 and above	2.70
46-46.9	2.40		

Above schedule met by Sinclair and Gulf on Nov. 17.

Humble Oil & Refining Co. Prices
(Ranger, North Texas, Mexia, Powell, Richland, Wortham, Lytton Springs, Currie, Moran and Nocona crudes all in Texas.)

On Nov. 1, Humble first posted the price schedule adopted by Prairie on Nov. 17, except that Humble is paying 5c less for each degree of gravity on oil below 28°.

Mirando, Tex.....$1.25

The Texas Co. posted same gravity and price schedule in Oklahoma, North, North Central and Central Texas on Nov. 5 as Humble, excepting it is paying $1.40 for all oil below 28° gravity in Texas fields.

Magnolia Petroleum Co.
(In Oklahoma, Kansas and North and East Central Texas)

Same grades and prices as posted by Prairie excepting that Magnolia is paying $1.30 for all oil below 28° gravity, effective Nov. 2.

Corsicana heavy.....$1.25
Iatan Tex..... 1.50

Carter Oil Co.
(Oklahoma and Kansas)

On Nov. 2, Carter posted same gravity and price schedule as Prairie is now maintaining.

PANHANDLE, TEXAS
Humble Oil & Refining Co.

Hutchinson, and Carson Counties.....$1.25

Gray County:		Wheeler County:	
28-28.9	$1.00	28-28.9	$ .90
29-29.9	1.05	29 29.9	.95
30-30.9	1.10	30 30.9	1.00
31-31.9	1.15	31-31.9	1.05
32-32.9	1.20	32-32.9	1.10
33-33.9	1.25	33 33.9	1.15
34-34.9	1.30	34-34.9	1.20
35-35.9	1.35	35 35.9	1.25
36-36.9	1.40	36-36.9	1.30
37-37.9	1.45	37-37.9	1.35
38-38.9	1.50	38 38.9	1.40
39-39.9	1.55	39-39.9	1.45
40-40.9	1.60	40-40.9	1.50
41-41.9	1.65	41-41.9	1.55
42-42.9	1.70	42-42.9	1.60
43-43.9	1.75	43 43.9	1.65
44 and above	1.80	44 and above	1.70

Magnolia Petroleum Co. posted flat price of $1.25 for all Panhandle Crude on Sept. 22, and Kay County Gas Co. on Oct. 4.

WEST TEXAS
(Crane, Upton and Crockett Counties)
Humble Oil & Refg. and Kay County Gas Co.

Below 26	$ .80	31-31.9	$1.10
26-26.9	.85	32-32.9	1.15
27-27.9	.90	33-33.9	1.20
28-28.9	.95	34-34.9	1.25
29-29.9	1.00	35-35.9	1.30
30-30.9	1.05	36 and above	1.35

NORTH LOUISIANA—ARKANSAS FIELDS
***Prices of Standard Oil Co. of Louisiana**
Caddo, Homer, Haynesville, Bull Bayou, El Dorado, Crichton and De Soto
Effective Nov. 4

Below 28	$1.40	40-40.9	$2.10
28-28.9	1.50	41-41.9	2.15
29-29.9	1.55	42-42.9	2.20
30-30.9	1 60	43-43.9	2.25
31-31.9	1.65	44-44.9	2.30
32-32.9	1.70	45-45.9	2.35
33-33.9	1.75	46-46.9	2.40
34-34.9	1.80	47-47.9	2.45
35-35.9	1 85	48-48.9	2.50
36-36.9	1.90	49-49.9	2.55
37-37.9	1.95	50-50.9	2.60
38-38.9	2.00	51 51.9	2.65
39-39.9	2.05	52 and above	2.70
Smackover, below 24			$1.10
" 24-24.9			1.35
" 25-25.9			1.40
" 26-26.9			1.45
" 27 and above			1.50
Bellevue			1.40
Cotton Valley			1.20
**Urania, La.			1.10
†Calion (East El Dorado)			.95

*Gulf and La. Oil Refg. Corp. met S. O. La. prices on Nov. 4 and The Texas Co. and Magnolia Pet met on Nov. 5.

**Posted by Louisiana Oil Refining Corp.

†Posted by Gulf.

STEPHENS, ARKANSAS
Posted by Atlantic Oil Producing Co.

Below 28	$1.30	29-29.9	
28-28.9	1.40	30 and above	

GULF COASTAL and SPINDLETOP
Posted by Humble Oil & Refining Co.

Grades A	$1.40	28-29.9	$1.65
Grades B:		30-30.9	1.70
Below 25	1.40	31-31.9	1.75
25-25.9	1.45	32-32.9	1.80
26-26.9	1.50	33-33.9	1.85
27-27.9	1.55	34-34.9	1.90
28-28.9	1.60	35 and above	1.95

Fields classified as A and B are Goose Creek, Hull, Liberty, West Columbia, Orange, Boling and Pierce Junction. All other fields are Grades A only.

Magnolia Petroleum is paying same prices in Spindletop as Humble, except that its top grade is 31-31.9 at $1.75, effective Nov. 16.

Group I.O.M.A. Meetings Discuss Advertising

CHICAGO, Dec. 11.—L. V. Nicholas, president of National Petroleum Marketers' Association and, as such, managing trustee of Independent Oil Men of America, with three of his staff, will be busy during December, traveling the United States in the interest of the I. O. M. A. advertising program. The work began in November and was recessed only during the American Petroleum Institute meeting in Tulsa.

The program has been to hold group meetings in various towns. The home office delegation travels from town to town overnight and sits in a group conference every day with all the I. O. M. A. members in the vicinity of the place they are. Meetings are announced in advance and thus far almost all members in various regions have attended.

The first meeting was held Nov. 10 in Chicago and was attended by members of the advertising movement in northern Illinois. The next three meetings came in the first week of December, in Milwaukee, Green Bay, Wis., and Minneapolis. Twenty members assemble in Milwaukee, 12 in Green Bay and 14 in Minneapolis. Raymond Shaw, director of publicity, T. A. Peck, head of the department of lubrication engineering, and F. J. Silsbee, assistant to the president, were on the first trip.

Mr. Shaw's message has to do with "hooking up" their local advertising with the national campaign. He urges them to put up spread red eagle signs at stations, feature the emblem in their home town newspaper advertisements and otherwise identify themselves with the movement.

"They might as well drop out of the national campaign and save their money if they are not going to identify their stations with the big campaign," Mr. Shaw said. "Moreover, they do their fellow members an injustice by subduing their national emblem at their stations."

Mr. Peck is explaining the workings of the sales plan for Red Hat motor oil. The I. O. M. A. is almost ready to put out a line of industrial oils under the Red Hat emblem, as well as a line of grease for automobiles and the industrial trade. He is ready to explain prices, profits and specifications to the members.

The next tour will be through St. Louis and southwest. At meetings already held changes have been announced in the general I. O. M. A. plan developed at Atlantic City. The recent and final decision of the group has been to continue Saturday Evening Post advertising rather than cease for a while and work on local publicity as was tentatively agreed upon in Atlantic City.

Within a few weeks the I. O. M. A. will begin to have small advertisements every week in the Saturday Evening Post. This policy will continue until just before the spring tourist season opens, at which time the organization proposes to resume its two-color ads in double-page spreads.

Purchasers, in All Fields (in Effect, Dec. 13, 1926)

GULF COASTAL and SPINDLETOP
Prices of The Texas Co.

Grades A	$1.40	*Grades B	$1.40
‡Grades B (light crude):			
35-35.9	$1.95	38-38.9	$2.10
36-36.9	2.00	39-39.9	2.15
37-37.9	2.05	40 and above	2.20

*Grades B include all heavy crudes which do not meet tests for Grades A or for Gulf Coast light crude.

‡The Texas Co.'s gravity and price schedule on oil below 35° is same as Humble's postings on Grades B.

ROCKY MOUNTAIN FIELDS
Prices of Ohio Oil Co. and Midwest Refining Co

‡Salt Creek 29-29.9	$1.55
" " 30-30.9	1.60
" " 31-31.9	1.65
" " 32-32.9	1.70
" " 33-33.9	1.75
" " 34-34.9	1.80
" " 35-35.9	1.85
" " 36-36.9	1.90
" " 37 and above	1.95
Elk Basin	2.00
Grass Creek light	2.00
Big Muddy	$1.85
Lance Creek	2.00
Rock Creek	1.85
Mule Creek	1.45
Rex Lake	1.25
‡Osage	2.00
‡Cat Creek, Mont.	2.00
Sunburst, Mont.	1.35
‡Hogback, N. Mex.	2.45
Artesia, N. Mex.	1.65

‡Posted by Midwest Refining Co. Midwest also buys Grass Creek light, and Elk Basin.

The Texas Co. buys Salt Creek and Big Muddy crude.

CALIFORNIA
Standard Oil Co. of California

Gravity	Signal Hill Huntington Beach	Inglewood Torrance	Whittier La Habra	Newhall, McKittrick, Kern River	Olinda-Brea Canon, Richfield	Athens-Rosecrans Dominguez	Monte-bello	Coyote Hills	Santa Fe Springs	Midway Sunset Elk Hills	Lost Hills	Coalinga	Wheeler Ridge	Santa Maria	Ventura
14-14.9	$ .85	$ .85	$ .85	$ .75	$ .85	.....	$ .85	$ .85	.....	$ .75	$ .75	$ .75	$ .75	$ .85	$ .85
15-15.9	.87	.87	.85	.75	.87	.....	.85	.85	.....	.75	.75	.75	.75	.85	.85
16-16.9	.90	.90	.85	.75	.90	.....	.85	.85	.....	.75	.75	.75	.75	.85	.85
17-17.9	.94	.94	.85	.75	.94	.....	.85	.85	.....	.75	.75	.75	.75	.85	.85
18-18.9	.98	.98	.86	.75	.98	.....	.86	.86	.....	.75	.75	.75	.75	.85	.85
19-19.9	1.04	1.04	.87	.75	1.04	.....	.87	.87	.....	.75	.75	.75	.75	.85	.85
20-20.9	1.10	1.10	.89	.....	1.10	.....	.89	.90	.....	.82	.82	.79	.78	.90	.90
21-21.9	1.16	1.16	.91	.....	1.16	.....	.91	.98	.....	.90	.90	.86	.81	.97	.97
22-22.9	1.22	1.22	.94	.....	1.22	.....	.94	1.06	.....	1.00	1.00	.93	.85	1.04	1.04
23-23.9	1.28	1.28	.....	.....	1.28	.....	.97	1.14	.....	1.11	1.11	1.00	.89	1.11	1.11
24-24.9	1.34	1.34	.....	.....	1.34	$1.34	1.01	1.22	$1.02	1.22	1.22	1.07	.93	1.18	1.18
25-25.9	1.40	1.40	.....	.....	1.40	1.40	1.05	1.30	1.08	1.33	1.33	1.14	.97	1.25	1.25
26-26.9	1.46	1.46	.....	.....	1.46	1.46	1.09	1.38	1.16	1.44	1.44	1.21	1.01	1.32	1.32
27-27.9	1.52	1.52	.....	.....	1.52	1.52	1.13	1.46	1.24	1.55	1.55	1.28	1.05	1.39	1.39
28-28.9	1.58	1.58	.....	.....	1.58	1.58	1.17	1.54	1.32	1.66	1.66	1.35	.....	1.46	1.46
29-29.9	1.64	.....	.....	1.64	1.64	1.64	1.21	1.62	1.40	1.77	1.77	1.42	.....	1.53	1.53
30-30.9	1.70	.....	.....	.....	1.70	1.70	1.25	1.70	1.48	1.88	1.88	1.49	.....	1.60	1.60
31-31.9	1.76	.....	.....	.....	.....	1.76	.....	.....	1.60	1.99	1.99	1.56	.....	.....	1.67
32-32.9	1.84	.....	.....	.....	.....	1.84	.....	.....	1.72	2.10	2.10	1.63	.....	.....	1.73
33-33.9	.....	.....	.....	.....	.....	1.92	.....	.....	1.84	2.21	2.21	1.70	.....	.....	1.79
34-34.9	.....	.....	.....	.....	.....	2.00	.....	.....	1.96	.....	2.32	1.77	.....	.....	1.85
35-35.9	.....	.....	.....	.....	.....	2.08	.....	.....	2.08	.....	.....	1.84	.....	.....	1.92
36-36.9	.....	.....	.....	.....	.....	2.16	.....	.....	2.16	.....	.....	.....	.....	.....	.....
37-37.9	.....	.....	.....	.....	.....	2.24	.....	.....	2.24	.....	.....	.....	.....	.....	.....
38-38.9	.....	.....	.....	.....	.....	2.34	.....	.....	2.34	.....	.....	.....	.....	.....	.....
39-39.9	.....	.....	.....	.....	.....	2.44	.....	.....	2.44	.....	.....	.....	.....	.....	.....
40-40.9	.....	.....	.....	.....	.....	2.54	.....	.....	.....	.....	.....	.....	.....	.....	.....
41-41.9	.....	.....	.....	.....	.....	2.64	.....	.....	.....	.....	.....	.....	.....	.....	.....
42-42.9	.....	.....	.....	.....	.....	2.74	.....	.....	.....	.....	.....	.....	.....	.....	.....

Santa Maria and Ventura Posted by Union Oil Co.

*Union Oil Co. also purchases Long Beach Crude and is maintaining the same gravity and price schedule in that field as the Standard maintains in Signal Hill and Huntington Beach fields. The Union also buys and pays the same prices as the Standard in the Rosecrans-Dominguez fields, on gravities ranging from 14 degrees to and including 24.9 degrees and in Santa Fe Springs, on gravities ranging from 20 to and including 23.9 degrees.

REFINERS' and COMPOUNDERS' SUPPLIES

Following are the average market prices for the week on materials used by refiners and compounders f. o. b. shipping point as effective this date.

Refiners' Supplies

	Dec. 13	Dec. 6
Soda Ash light 58¼ bags.cwt.	$1.38	$1.38
Silicate of Soda 60 deg. drums.....cwt.	-$1.65	-$1.65
Sal Soda wks.....90- 1.10	.90- 1 10	
Caustic Soda 70¼ solid..cwt.	- 3.05	3.05-3.10
Chloride of Lime.....cwt. works.....	- 2.00	- 2.00
Sulphuric Acid 60 deg. tank cars f. o. b. shipping point.....per ton	10.50-11.00	10.50-11.00
Liquid Chlorine tank cars works.....lb.	- .04	- .04

Compounders' Supplies (Open Market)

Vegetable Oils—		
Linseed carloads spot.....lb.	10.7	10.6
December.....	10.7	10 6
Tanks, spot.....	10.1	10
*Soya Bean spot, Bbls....lb.	12½	12½
Castor Oil—		
No. 1 Carlots, Bbls.....	-.13	-.12¾
No. 3 Carlots, Bbls.....	-.12¼	-.11¾
Animal Oils—		
English Degras.....	.05½	-.05¾
Domestic Degras, bbls., carloads.....lb.	-.04¾	-.04¾
*Horse.....lb.	-.08¾	-.08¼
Oleic Acid—		
Dist. Bbls.....lb.	.09½-.10	09½-.10
Saponified Bbls.....lb.	.09¾-.10¼	.09¾-.10½
Lard Oils—		
Prime		
Winter Strained. to 1½ ffa.	.40/45c.t.lb. .15¾	.14½
Extra		
Winter Strained. 2 to 4½ ffa.	.40-45c.t.lb. .12¾	.12¾
Extra..... 4 to 5 ffa.	.40-45c.t.lb. .12¼	.12¼
Extra No.1. 7 to 10 ffa.	.40-50c.t.lb. .10¼	.10¼
No. 1.....15 to 18 ffa.	.40-45c.t.lb. .10	.10
No. 2.....22 to 23 ffa.	.40-45c.t.lb. .09¾	.09¾
Prime Edible Tallow under 1¾ ffa.		
40-45c.t.N.Y.....lb.	-.08½	-.08¼
Tallow acidless.....lb.	-.10¼	-.10¾
Lard Stearine.....lb.	-.16½	-.16½
Oleo Stearine.....lb.	-.10	-.09¾
Neatsfoot Oil—		
Pure.....bbls.-lb.	.18¾	.18¾
Extra.....do lb.	.10¼	.10¼
No. 1.....bbls.-lb.	.10	.10
Cold pressed.....lb.	.17¾	.17¾
Fish Oils—		
Menhaden Oil		
Light pressed.....gal.	-.62	-.58
White.....gal.	-.67	-.67
Yellow bleached.....gal.	-.65	-.65
*Herring tank cars coast.....gal.	-.47	-.47
Whale, extra winter bleached.....gal.	-.82	-.82
Seal.....gal.		nominal
Naval Stores—		
Turpentine, N. Y.....gal.	-.88	-.88
Turpentine†.....gal.	-.80¾	-.82
Rosin, B. N. Y.....bbl.	12.35	12.60
Rosin, F. N. Y.....bbl.	12.55	12.60
Rosin, B†.....bbl.	10.80	11.05
Rosin, F†.....bbl.	10.90	11.05
Rosin Oil 1st run.....gal.	.64	.79
Rosin Oil 2nd run.....gal.	.67	.90
Pine Tar—		
Kiln Burnt.....bbl.	16 00	16.00
Retrt.....bbl.	16.00	16.00

†Savannah, Ga. market.
*Nominal.

Alcohol—Denatured— Formula 5		
Bbls.....gal.	-40	-40
Drums.....gal.	-38	-38

Petroleum Industry Data Paves Way For Breaking Potash Combine

HOUSTON, Dec. 13

AMERICAN farmers who depend upon potash to restore fertility to their lands will eventually reap other rewards from the activities of the petroleum industry than the receipt of bonuses and rentals for leaseholds.

They will be able to purchase potash under favorable price conditions as compared with costs that are now prohibitive to some of them because of the present domination of world markets by a European combine.

The Permian salt basin area west of San Angelo, where oil operators are continually extending Texas wildcatting activities, will be the source of the boon promised farmers of the state and nation. Within that area, consisting of thousands of square miles, the presence of potash deposits has been known since 1912, but only within the last three or four years has the commercial importance of these salts been realized.

Beginning with the development of the Big Lake oil field, in sourthwestern Reagan county, and extending into subsequent operations in Crane-Upton and Crockett counties, the importance of vast potash deposits has been made clear. This has been the result of the collection of data disclosed in oil test drilling.

Oil Companies Supply Data

THE oil companies have co-operated freely with representatives of the national and state governments in their search for potash deposits by furnishing cuttings from formations drilled into and the United States Bureau of Mines has now announced three areas for the location of tests to be drilled specifically for potash.

Almost invariably these areas have been picked on the strength of data provided by the oil companies from logs or cuttings obtained in the drilling of oil test wells. So, indirectly, the industry promises to do something else for the American farmer than to pay him bonuses and rentals for leaseholds, plus royalties on oil produced; the time will come when the industry will have contributed its part to making possible the revitalizing of the farmer's soil at relatively low fertilizer costs.

Not only this, but it is also conceivable that the vitalizing potash to be found under the surface may be used in some instances to make fertile the very soil it now underlies. Regardless of that, the agriculture of the various states, whether oil producing or not, will benefit materially from the work now getting under way.

Growth of the American potash industry, which will make this country independent of foreign sources of supply, is dependent upon the results of government tests about to be made and the interesting of capital in the financing of recovery operations. There is no doubt, however, that these problems will be worked out in the future as samples of potash salts taken from oil test wells in the region west of San Angelo have shown as high as 9.75 per cent of potash, equivalent to 14.17 per cent of the soluble salts found.

Government Backs Work

UNDER the terms of an enabling act approved by congress, June 25, 1926, the Bureau of Mines is required to negotiate contracts with all land owners and holders of mineral rights within areas designated for the drilling of exploratory potash tests.

Three of four such alternative locations favored by the Bureau of Mines have been announced in their order of preference as follows:

(1)—Within a radius of two miles of the No. 1 Ed S. Hughes oil well of the Dixie Oil Co., Inc., northwest corner of sec. 4, William Teer survey, Upton county.

(2)—Within a similar radius of the No. 1 Mary Baker oil discovery well of the Hurdle district, in sec. 8, Grooms survey, Upton county, now owned by the Republic Production Co. and the Marland Oil Co. of Texas.

(3)—Within a similar area centering at the No. 1 Harris Brothers dry hole of the Mid-Kansas Oil & Gas Co., in the southwest quarter of sec. 20, block H-H2, GC&SF survey, Crokett county.

The fourth alternative location is yet to be announced.

Both the No. 1 and No. 2 areas center inside the field limits of Hurdle district oil development; the No. 3 area is in a section no longer active for oil testing since the drilling of a number of dry holes.

The enabling act approved by congress last June authorizes the expenditure of $100,000 annually for a period of five years for the purpose of potash explorations, the money to be expended under the direction of the Secretary of the Interior and the Secretary of Commerce.

Negotiations with land owners and holders of mineral rights for the drilling of potash tests are preliminary steps toward the more active operations contemplated. Since contracts must be negotiated with all of them before a test hole can be drilled in any of the designated areas the failure of any land owner or holder of mineral rights to accept the government's terms would therefore, block drilling at this particular location.

Deposits Known Since 1912

THE first discovery of potash in Permian age beds of western Texas was made in 1912 when Dr. J. A. Udden of the Bureau of Economic Geology at Austin examined a sample of brine from the deep well drilled at Spur, Dickens county, by Swenson & Sons. The brine, which had been standing in the well for two months and which was taken from a depth of 2200 feet, tested 5.4 per cent potassium calculated as chloride.

A few years later the United States Geological Survey and the Texas Bureau of Economic Geology began a co-operative search for commercial deposits of potash, but the funds available were not large enough to permit of the extensive and systematic investigations desired.

Since 1917 a representative of the bureau has been co-operating in the drilling of oil test wells in West Texas for the purpose of locating sources of potash supply; more particularly since the development of the Big Lake and Hurdle district fields, together with attendant wildcatting operations.

Shallow Deposits at Hurdle

POTASH bearing beds found in the Upton-Crane, Crockett and Reagan county areas lie at depths of 400 to 1400 feet below the surface, the shallower deposits being found in the Hurdle district and in the vicinity of the Harris Brothers oil test failure. Oil well cuttings show excellent polyhalite ($MgSC_4$, K_2SO_4, $2CaSO_4$, $2H_2O$), according to announcements made at various times by the United States Geological Survey and the United States Bureau of Mines.

H. W. Hoots mentions in U. S. G. S. bulletin 780-B a number of beds 10 to 15 feet thick shown to contain as much as 8 per cen K_2O in the total sample. Even larger percentages are now believed to exist in the alternative areas more recently picked by the Bureau of Mines for potash explorations.

As polyhalite, the only potash mineral known to exist in western Texas, is somewhat less soluble than common salt, it has been pointed out by Hoots that the enrichment of a sample by solution is considered to be more likely than its impoverishment; however, he says it is not impossible that solution has impoverished cuttings by removing all trace of the extremely soluble salts such as sylvite (KCI). Most samples taken in the past have come from tests drilled for oil, hence they have been churned in drill water for periods probably averaging two hours before being bailed from the well.

Transactions In Oil Shares on New York Stock Exchange

1925 High	1925 Low	1926 High	1926 Low		Listed Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions week ended Dec. 11 Sales	First	High	Low	Last	Ch'ge
.....	.....	32⅞	24¼	(sh)	81[illegible],800	N.P.	Amerada Corp	50cQ	Oct. 30, 26	17,500	29⅞	31½	29⅜	31½	+1½
79¾	48	74	39⅞	(sh)	200,000	N.P.	American Republics	.....	.....	100	46½	46½	46½	46½	—1½
47¼	32	59½	44¾	$	56,000,000	$ 25	Associated Oil	50cQ	Sept. 25, 26	100	50	50	50	50	+ ⅜
117½	95½	128⅜	97		50,000,000	100	Atlantic Refining	.....	June 16, 24	8,100	109½	112¼	108⅛	110¼	+ ¼
117¾	113½	120	115⅛		20,000,000	100	do pfd	$1¾Q	Nov. 1, 26	100	116½	116½	116½	116½	0
33½	18¾	33½	23¾		25,000,000	25	Barnsdall Corp. A	50cQ	Oct. 1, 26	10,700	28	28¼	27¾	28	0
30	16	29½	22½		3,713,275	25	do B	50cQ	Oct. 1, 26	1,300	26	26	25¾	26	0
34⅜	23⅞	38⅛	29¾	$	47,591,950	$ 25	California Petroleum	50cQ	Dec. 1, 26	7,500	31¼	31⅜	31	31	— ¼
70	42½	94½	50		23,631,200	100	General Asphalt	.....	.....	44,700	85½	87⅜	83	86¾	+ ¾
109	86½	140⅛	94⅞		7,354,000	100	do pfd	$1¾Q	Dec. 1, 26	1,000	127½	130	127	130	—3
85	59	79	50¾		25,000,000	100	Houston Oil	.....	.....	2,900	58⅝	59½	58	58	—1¾
41¾	13¼	34	19⅝	(sh)	500,000	N.P.	Independent Oil & Gas	25cQ	Oct. 18, 26	49,700	30¾	30½	29¼	29⅝	— ⅜
14½	5½	13¾	7¾	$	2,283,960	$ 10	Indian Refining	.....	Dec. 15, 20	2,000	8½	8¾	8	8¾	+ ⅛
12⅝	6	12½	7½		4,546,490	10	do ctfs	.....	.....	1,100	8	8	7¾	7⅞	— ⅛
110	77	104	90		2,296,400	100	do pfd	.....	Dec. 15, 21	.....	.....	.....	.....	.....	.....
1½	¼	¾	¼		1,644,760	10	Kansas & Gulf	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	24½	19⅛	(sh)	4,000,000	N.P.	Lago Oil & Transport	.....	.....	9,300	21⅛	21¼	20¾	20¾	— ⅜
23¾	13¾	19⅞	12	(sh)	1,131,288	N.P.	Louisiana Oil Refining	.....	.....	4,400	14⅝	15½	14⅜	14¾	— ⅛
.....	.....	97	93	$	4,000,000	$100	do pfd	$1¾Q	Nov. 15, 26	400	93½	93½	†93	93½	+ ⅜
35½	20¾	28⅞	16½	(sh)	830,000	N P.	Maracaibo Oil	.....	.....	4,200	20½	21	20¾	21	0
60½	32⅝	63⅜	49¼	(sh)	2,319,768	N.P.	Marland Oil Co	$1Q	Sept. 30, 26	52,300	55⅜	55⅞	54½	55¼	— ¼
250	225	.....	.....	$	45,942,800	$100	Mexican Petroleum	$3Q	Oct. 20, 26	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....		12,000,000	100	do pfd	$2Q	Oct. 20, 26	.....	.....	.....	.....	.....	.....
22½	20	13¾	6	(sh)	945,939	N.P.	Mexican Seaboard	.....	Nov. 15, 24	1,800	8⅛	8¼	7½	8	0
88	25¾	87	27½	(sh)	1,357,800	N.P.	Mid-Continent Petroleum	.....	Aug 1, 23	23,500	31	32¾	30¾	32⅜	+1⅜
94¼	83	102½	90	$	6,718,000	$100	do pfd	$1¾Q	Dec. 1, 26	.....	.....	.....	.....	.....	.....
3¾	⅝	2½	¾		25,415,540	10	Middle States	.....	July 1, 23	14,700	¾	⅞	¾	¾	— ⅛
1½	1½	1⅝	½		4,984,680	....	do ctfs	.....	.....	2,400	½	½	½	½	0
78½	51⅝	83¼	1	(sh)	3,500,000	N.P.	Pacific Oil	.....	Jan. 20, 26	9,300	1½	1¾	1½	1¾	+ ¼
83⅞	59½	76½	56⅛	$	48,307,400	$ 50	Pan American P. & T	$1.50Q	Oct. 20, 26	2,500	64¼	64¼	62⅞	63	—1
84½	60⅝	78⅜	56⅞		91,246,000	50	do B	$1.50Q	Oct. 20, 26	19,000	63⅛	63⅞	62⅝	62⅞	— ⅛
49¾	37¼	46	30	(sh)	400,000	N.P.	Pan American Western B	50cQ	Oct. 30, 26	4,100	34	34⅜	33½	34	+ ½
6¼	2¼	32	4½	(sh)	198,770	N.P.	Panhandle P. & R	.....	.....	5,800	15⅞	16	15¼	15¾	— ¼
60½	37	99⅜	51	$	2,935,200	$100	do pfd	.....	July 2, 23	200	73	75	73	75	+3
47⅛	36¼	56⅝	40	(sh)	2,406,736	N.P.	Phillips Petroleum	75cQ	Oct. 1, 26	103,100	55¼	56½	54½	56½	+1⅜
3½	1¼	1⅞	½	$	29,622,925	$ 25	Pierce Oil Corp	.....	.....	8,300	¾	¾	½	⅝	— ⅛
40	20¼	27⅛	11⅝		15,000,000	100	do pfd	.....	Feb. 1, 22	600	17⅛	17¼	16	16	—1⅜
8¼	4½	7	2½	(sh)	2,500,000	N.P.	Pierce Petroleum	.....	.....	9,800	3½	3½	3	3	— ½
32⅝	12½	20¾	11	$	11,467,850	$ 50	Producers & Refiners	.....	Sept. 15, 23	1,100	19⅜	19¾	18	18	—1¼
47⅝	27	41¾	30¾		2,845,350	50	do pfd	.....	May 1, 25	200	39	39	39	39	+ ⅜
88¾	25⅜	31	25¼		75,959,250	25	Pure Oil Co	$7½cQ	Dec 1, 26	7,000	27¾	27¼	26⅝	27	— ¼
108½	108	112¾	106		13,000,000	100	do 8% pfd	$2Q	Oct. 1, 26	.....	.....	.....	.....	.....	.....
57⅜	48¼	57⅜	47¾	(sh)	658,082	13.40	Royal Dutch, N. Y. shares	$1.739	Aug. 2, 26	900	49⅛	49⅞	49⅜	49¾	+ ½
49	39½	48⅝	40¾	(sh)	87,685	£2	Shell Transport & T	$1.21	July 24 26	400	44	44⅛	43⅛	43⅛	+ ⅜
28⅜	21⅜	30⅞	24	(sh)	10,000,000	N.P.	Shell Union Oil	35cQ	Sept. 30, 26	23,400	30½	30½	x29¼	29¼	0
106½	99½	114	103	$	18,350,400	$100	do pfd	$1½Q	Nov. 15, 26	900	109	109	108⅛	109	+ ⅛
28½	17¾	28⅝	15⅜		7,208,080	10	Simms Petroleum	50cS.A.	July 1, 26	8,100	19½	19⅞	19⅛	19½	0
24⅞	17	24⅞	16¾	(sh)	4,500,682	N P.	Sinclair Consolidated	.....	May 31 24	13,700	19¾	19⅝	18¾	18¾	— ¾
94⅛	78¾	99½	90	$	17,508,300	$100	do pfd	$2Q	Nov. 15, 26	300	97	97½	97	97	0
32½	21¾	36⅞	26⅝		27,393,090	25	Skelly Oil Co	50cQ	Dec 15, 26	8,100	34⅛	34⅞	33¾	34	— ⅛
.....	.....	63¾	52⅝	(sh)	13,016,434	N.P.	S. O. California	50cQ	Dec. 15, 26	15,000	58½	58⅝	57¾	57¾	— ¼
47½	38⅜	46¾	37½		517,064,800	25	S. O New Jersey	25cQ	Dec. 15, 26	57,700	38½	38¾	37½	38	— ⅛
119	116¾	119⅝	115		199,972,900	100	do pfd	$1¾Q	Dec. 15, 26	13,000	115⅛	115¾	115⅛	115¼	+ ⅛
.....	.....	33¼	32½		421,750,400	25	S. O. New York	40cQ	Dec. 15, 26	24,500	32⅞	33¼	32½	32⅞	0
43⅞	38⅜	41⅝	30⅝	(sh)	1,171,951	N.P.	Sun Oil	25cQ	Dec. 15, 26	500	32⅛	32⅛	31½	32	0
6⅛	2	5¼	1	(sh)	1,121,368	N.P.	Superior Oil Corp	.....	Dec. 20, 20	75,700	4¾	*5¼	4½	5⅛	+ ⅜
55	42¾	58	48	$	88,090,000	$ 25	The Texas Co	75cQ	Sept. 30, 26	8,700	56½	57¾	x56	56½	+1⅜
.....	.....	53	53½		28,590,300	25	The Texas Corp	.....	.....	.....	.....	.....	.....	.....	.....
23⅜	10⅞	19½	12		8,380,340	10	Texas Pacific Coal & Oil	.....	June 30, 23	4,200	14¾	14¾	14⅜	14⅜	— ⅜
36⅞	30¼	39¼	27	(sh)	2,137,570	N.P.	Tide Water Oil Co	37½c	Sept. 30 26	900	28⅝	28⅜	x28⅜	28½	— ¼
101	99	103	87¼	$	20,672,900	$100	do 5% pfd	$1.25Q	Nov. 15, 26	1,300	90	90	88¾	88¾	—1¼
5⅞	3½	5½	3	(sh)	3,742,029	N.P.	Transcontinental Oil	.....	.....	14,700	3⅞	4	3¾	3⅞	— ⅛
43⅜	33	58⅜	37¾	$	40,480,800	$ 25	Union Oil of California	50cQ	Nov. 10, 26	7,500	53⅞	53⅞	52¾	53	— ½
134	96¼	120	80		24,423,300	100	Union Tank Car Co	$1¼Q	Dec. 1, 26	1,400	118	119½	117½	117½	— ½
117⅛	113¼	118	113¼		12,000,000	100	do pfd	$1¾Q	Dec. 1, 26	.....	.....	.....	.....	.....	.....
31¾	25½	29¼	25⅛	(sh)	490,000	N.P.	White Eagle Oil & Refining	50cQ	Oct. 20, 26	700	25½	26⅛	25½	26⅛	+ ¼

*New High †New Low x Ex-Dividend Total Sales 712,400

Pittsburgh Stock Exchange

1925 High	1925 Low	1926 High	1926 Low	Par Value	Stocks	Transactions Week Ended Dec. 10 Sales	First	High	Low	Last	Ch'ge
.....	.....	8½	6⅝	N.P.	Andes Petroleum	.....	.....	.....	.....	.....	.....
8¼	5¼	8½	5¾	$ 10	Arkansas Nat.Gas	2,775	7¾	7¾	x7⅝	7⅝	— ⅛
.....	.....	90½	79¾	$100	Columbia Gas (w.i.)	592	90	*90½	88¼	88⅜	—1⅜
.....	.....	101⅜	95	$100	do pfd w.i	71	101⅜	*101⅜	101	101	0
18	14½	17	12½	$ 10	Devonian Oil	385	15	15	14⅜	15	0
112⅝	105⅜	116½	112	$100	Duquesne Lt. 7% pfd.	69	115½	115½	115	115½	0
.....	.....	10	5¾	N.P.	Houston Gulf Gas	3,630	6½	7¼	6¼	6½	— ⅛
.....	.....	46	39	25	Lone Star Gas Corp	1,947	45	45	44⅛	44½	— ¼
37¼	31	47⅜	33⅛	25	Ohio Fuel Corp	42	47⅜	*47⅜	46¾	46¾	— ⅛
.....	.....	47½	42	....	do ctfs. of deposit	223	47	47¼	46¾	46¾	— ½
.....	.....	6¾	5	....	Ohio Oil & Gas	.....	.....	.....	.....	.....	.....
34	26	34	28	25	Oklahoma Nat. Gas	.....	.....	.....	.....	.....	.....
.....	.....	21	19¼	....	do ctfs. of deposit	3,675	20	20¾	20	20¾	+ ¼
8¼	5	5⅝	3⅛	5	Pittsburgh O. & G	.....	.....	.....	.....	.....	.....
9⅝	6	10	7½	10	Salt Creek Cons	475	8⅛	8⅛	7⅞	8	+ ⅛
13¾	8½	27	8	10	Tidal Osage	800	21	21½	21	21½	+ ½
.....	.....	45	40	N.P.	Waverly Oil Wks. "A"	1,900	43½	*45	43¼	44½	+1

Pittsburgh Curb Market

1925 High	1925 Low	1926 High	1926 Low	Par Value	Stocks	Transactions Week Ended Dec. 10 Sales	First	High	Low	Last	Ch'ge
2½	.60	3⅜	2½	$5	Colombia Synd	.....	.....	.....	.....	.....	.....
.60	.15	.20	.06	5	Duquesne Oil	1,100	.20	.20	.20	.20	0
9	5½	22	22	10	Forest Oil	.....	.....	.....	.....	.....	.....
32⅝	64	91½	85	25	Gulf Oil Corp	.....	.....	.....	.....	.....	.....
.....	.....	79	79	100	Houston Gulf pfd	.....	.....	.....	.....	.....	.....
12½	3¼	12	7½	N.P.	Leonard Oil & Dvlp	.....	.....	.....	.....	.....	.....
.....	.....	1⅝	1⅝	N.P.	Mountain & Gulf	.....	.....	.....	.....	.....	.....
.....	.....	30¼	29	....	Oklahoma Gas	.....	.....	.....	.....	.....	.....
.47	.20	2	.15	10	Omar O.&G	7,050	1.40	1.40	1.25	1.30	—.05
.....	.....	2	1¼	5	Pittsburgh Oil Dev	.....	.....	.....	.....	.....	.....
27½	25	33½	20	10	Plymouth Oil	110	28	28	27¾	27¾	— ¼
7	3	5½	3	5	States Oil	.....	.....	.....	.....	.....	.....
4	1⅞	3½	2	$1	Texon Oil & Land	4,100	3	3	3	3	—2⅜
.....	9	25¾	8	10	TidalOsage(non-voting)	100	18½	18½	18½	18½	0

*New High †New Low xEx Dividend ‡Ex Rights

NEW YORK BONDS

Week Ending Dec. 10

	High	Low	Last	Ch'ge
Amer. Rep. Deb. 6s	99¼	99	99	0
Assoc. Oil gold 6s	103	102¾	103	0
Atl Gulf Refining 5s	69¾	69	69	— ¾
Atlantic Refg. deb. 5s	101½	101⅛	101⅛	+ ⅛
Barnsdall Corp. 6s	99⅞	99	99⅜	— ⅜
Cal. Petrol. sf 6½s	104	103¾	103¾	0
Cal. Petrol. Cor 5½s	100⅞	100⅜	100½	— ¼
Empire Gas & Fuel 7½s	105⅜	105	105	— ⅜
Empire Gas & Fuel 6½s	100	99⅜	99½	— ⅜
Gen. Asphalt 6s	108½	107½	108½	+ ½
Gen. Petroleum 5s	101⅞	101¼	101⅝	+ ⅛
Humble Oil & Refg. 5½s	102⅜	102¼	102¼	— ⅛
Mid-Cont. Pet. 6½s	104⅞	104¾	104¾	0
Pan-Amer. P & T 7s	105¼	104⅞	104⅞	— ⅛
Pan-Amer. P & T 6s	105½	104½	105	— ½
Pierce Oil sf 8s	103¾	103¾	103¾	+ ½
Prod. & Refnrs. 8s	111	110¾	110¾	— ¼
Prod. & Refnrs. 8s with wi.	110¾	110¾	110¾	0
Simms Pet. cvt. 6s	101½	100¾	101½	0
Sinclair Con. Oil Col. 7s	97⅞	96¾	97¾	0
Sinclair Con. Oil Con. 6½s	92⅝	92⅛	92⅜	— ⅛
Sinclair Con. Oil 6s	100¾	100¼	100⅛	— ⅛
Sinclair Crude Oil 6s	100⅞	100⅝	100¾	0
Sinclair Pipe Line sf 5s	93	92¼	92¼	— ¼
Superior Oil 7s	100½	100	100½	+ ½
Union Oil of Cal. 6s-A	108¼	107½	107½	+ ¼
UnionOil of Cal. 5s-B	101½	101¼	101⅜	0
Union Oil of Cal.5s-C	99⅜	98⅞	99½	+ ½

CANEY, KAN.—Earl Gordon, of the Independent Oil & Gas Co., spent the fore part of the week of Nov. 21 taking inventory and making a survey of a plant in Kansas recently purchased by his company.

Standard Oil Stock Traded in New York

1925 High	1925 Low	1926 High	1926 Low		Outstanding Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions Week Ended Dec. 10 Sales	First	High	Low	Last	Ch'ge
26¾	17¼	21	16¾	£	4,000,000	£1	Anglo American	60¾cS.A.	May 27, 26	3,400	19½	19½	19⅛	19¼	+ ⅜
.....	.....	20¼	16½		.....	£1	do ctfs non-votg	.....	.....	1,200	18⅝	18⅝	18½	18½	— ⅛
.....	.....	.....	.....		.....	....	do voting ctfs	.....	.....	100	1⅝	1⅝	1⅝	1⅝	— ⅛
4¼	1⅜	2¼	1⅜	(sh)	500,000	N.P.	Atlantic Lobos	.....	.....	400	4¾	4¾	4	4	— ⅞
12¾	8	5	3¼	$	10,000,000	$10	do pfd	.....	.....	.....	.....	.....	.....	.....	.....
240	205	301	226		1,000,000	100	Borne Scrymser	$4S.A.	Oct. 15, 26	50	68	68	68	68	+19
.....	.....	70	49		.....	....	do new	.....	.....	400	45½	45½	44¾	45	— ¾
72	53½	59½	42		10,000,000	50	Buckeye Pipe Line	$1Q	Dec. 15, 26	500	79½	79½	x77	77	—1
74	48½	82½	65		3,000,000	25	Chesebrough Mfg	75cQ	Sept. 30, 26	.....	.....	.....	.....	.....	.....
115	110	.....	.....		1,000,000	100	do pfd	$1¾Q	Sept. 30, 26	8,700	20	20	19⅝	19¾	— ½
31½	21⅞	25⅞	17¾		34,914,280	10	Continental Oil	25cQ	Dec. 15, 26	.....	.....	.....	.....	.....	.....
17¾	10	17	13½		1,500,000	25	Crescent Pipe Line	.....	Sept. 15, 23	60	...	105	104	105	+1
156	132	137	102		3,000,000	100	Cumberland Pipe Line	$3Q	Dec. 15, 26	150	50	50	49½	49½	+1
96	61	63¾	43		5,000,000	100	Eureka Pipe Line	$1Q	Nov. 1, 26	1,100	12	12	11½	11¾	— ⅜
68½	23½	32½	9¾		16,000,000	100	Galena Signal Oil	.....	June 30, 25	10	42	42	42	42	—3
105	88	94½	35		4,000,000	100	do new pfd	.....	June 30, 26	90	45½	45½	†45	45	— ¼
114	95	97½	45		2,000,000	100	do old pfd	.....	June 30, 26	4,400	59⅜	59⅜	57½	57½	—1¾
95	42¼	68¾	52		72,916,650	25	Humble Oil & Refining	30cQ	Oct. 1, 26	100	127¼	127½	†127¼	127¼	— ¾
154½	127	144½	127¼		20,000,000	100	Illinois Pipe Line	$6S.A.	Dec. 15, 26	14,500	37⅜	39	37¾	38¼	+ ⅜
39¾	27¾	39¾	31¼	(sh)	6,491,852	N.P.	Imperial of Canada	25cQ	Dec. 1, 26	600	60	60	57	57	—4½
84	57⅜	70	41½	$	5,000,000	50	Indiana Pipe Line	$1Q	Nov. 15, 26	14,400	31⅜	31⅝	31⅜	31⅜	+ ⅛
35¾	22⅛	35¼	28¾	(sh)	7,118,138	N.P.	International Petroleum	25c	Nov 15, 26	5,100	13	13⅜	12⅞	13¼	+ ⅜
25¾	16½	20¾	12½	$	6,36[illegible],500	$12½	National Transit	25cQ	Dec. 15, 26	50	32½	32½	32½	32½	0
79	49¾	51½	27⅛		5,000,000	100	New York Transit	.....	July 15, 26	100	75	75¼	75	75¼	+ ½
88	67½	80½	64		4,000,000	100	Northern Pipe Line	$3S.A.	July 1, 26	2,200	61¾	61¾	59½	59½	—1½
75⅛	60¼	67¾	53¾		60,000,000	25	Ohio Oil Co	50cQ	Dec. 15, 26	400	17½	17½	17	17	+ ¼
44½	19	24¾	15		10,000,000	25	Penn Mex Fuel	.....	May 21, 25	6,500	50¼	50½	50	50¼	0
65½	45⅞	60¾	48		60,000,000	25	Prairie Oil & Gas	50cQ	Nov. 30, 26	1,350	124½	125¼	124	125¼	+ ¾
129¾	106	127½	122¾		81,000,000	100	Prairie Pipe Line	$2Q	Oct. 30, 26	50	197	197	192	192	—4
254	200	220	184½		4,000,000	100	Solar Refining Co	$5S.A.	Dec. 20, 26	100	22	22	†22	22	— ½
103	63	74½	22		10,000,000	100	Southern Pipe Line Co	.....	Mar. 1, 26	2,700	38¾	40	38⅜	40	+1¼
47⅝	45	50	34½		20,000,000	25	South Penn Oil Co	37½cQ	Sept. 30, 26	50	56	56	56	56	+ ½
84	50	58½	49		3,500,000	100	South West Pa. Pipe Line	$1Q	Oct. 1, 26	19,300	65½	65½	65⅛	65¼	— ¼
70¾	59½	70½	60½	$	223,756,258	$25	S. O. Indiana	62½cQ	Dec. 15, 26	1,700	21½	21⅞	20	21	0
46	30⅛	36½	16¾		8,000,000	25	S. O. Kansas	.....	June 16, 24	700	119	119	118⅛	119	0
137	114¾	134¾	108		16,864,484	25	S. O. Kentucky	$1Q	Sept. 30, 26	900	47¾	48	47½	47½	— ½
.....	.....	51½	42		4,518,000	25	S. O. Nebraska	6½cQ	Dec. 20, 26	14,100	32¾	32⅝	32⅜	32⅝	— ¼
48¾	40¼	47¼	30¾		358,102,000	25	S. O. New York	40cQ	Dec. 15, 26	800	35[illegible]½	35[illegible]½	33[illegible]	35[illegible]	+1
369	338	362	288		14,000,000	100	S. O. Ohio	$2½Q	Oct. 1, 26	10	118	118	118	118	0
128	116	122	117		7,000,000	100	do pfd	$1¾Q	Dec. 1, 26	450	16	16¼	†15[illegible]	15[illegible]	— ⅜
27	12	23	15⅜		1,722,931	25	Swan-Finch Co	.....	Nov. 1, 19	2,200	94½	95	94½	94¾	+ ¼
109⅛	80⅛	112	90¼		61,919,950	25	Vacuum Oil Co	50cQ	Dec. 20, 26	100	19	19	19	19	+ ⅛

Oil Dividends

	Amt.	Payable	Stock of Record
Gulf Oil q	37½c	Jan. 1	Dec. 20
Humble Oil q	30c	Jan. 1	Dec. 11
do extra	20c	Jan. 1	Dec. 11
Indiana P. L. q	$1	Feb. 15	Jan. 21
Margay Oil q	25c	Jan. 10	Dec. 20
Texon Oil q	20c	Jan. 25	Dec. 27
Group No. 1	$750	Jan. 25	Dec. 27
White Eagle q	50c	Jan. 20	Dec. 31

Cleveland Stock Market

Dec. 10

	Par	Bid	Asked	Last Sale
Canfield Oil Co	$100	.....	.....	110
do pfd	100	95	.....	95
Fred G. Clark Co	10	3⅜	.....	3⅝
National Refining Co	25	40½	45	40½
do pfd	100	130	.....	132
Paragon Refining Co	25	6⅞	7	6¾
do pfd	100	65	.....	70

xEx-dividend

NEW YORK CURB BONDS

Week Ending Dec. 10

	High	Low	Last	Ch'ge
Beacon Oil 6s'36	102	101¼	101¼	0
Cities Serv. 6s '66	97¼	96⅞	97¼	+ ¼
Cities Serv. 7s "D" '66	122¾	122¼	122¼	0
Galena S O 7s '30	89	87½	88	+ ½
General Pet. 6s '28	101¼	101	101¼	— ⅜
Gulf Oil 5s '37	100¾	100¼	100¾	0
Indepen. Oil 6½s '31	102	100⅛	102	0
Pan Amer. Pet. 6s '40	100¼	99⅛	100¼	+ ¾
Pennok Oil 6s '27	100	100	100	0
Pure Oil 6½s '33	103½	103½	103½	0
Richfield Oil 6s wi '41	99	99	99	0
S O N J 5 wi	102¼	101¾	102	0
S O N Y 4½s wi	97⅞	97¾	97⅞	0
S O N Y 6½s '33	105¾	105	105	— ½
Sun Oil 5½s '39	99¾	99½	99¾	— ¼
Tidal Osage 7s '31	102⅞	102⅞	102⅞	0
Trans. Cont. Oil 7s '30	97⅛	96	96¾	0
Valvoline 7s '37	105	104¾	105	0

New York Curb Market

1925 High	1925 Low	1926 High	1926 Low	Par Value	Stocks	Transactions week ended Dec. 10 Sales	First	High	Low	Last	Ch'ge
11½	2½	14½	4	$ 5	Amer. Maracaibo	69,700	6½	7⅛	6⅜	7	+ ⅝
8¾	5	8¾	5¾	$10	Arkansas Nat. Gas.	1,600	7¾	7¾	7½	7½	— ¼
.....	.....	19¾	14⅛	N.P.	Beacon Oil	3,400	18⅛	18⅛	17½	17⅝	— ⅛
47½	38	.....	.....	$25	British-American	400	77	78	76⅞	77½	+1¼
10¼	2¾	28	9¼	25c	Carib. Syndicate	109,900	22¾	*28	22⅜	26⅝	+4
43	35	49¾	37½	$20	Cities Service	9,500	49¼	49⅜	49¼	49⅜	0
85⅜	80¼	92½	82¾	100	do pfd	2,300	92½	92½	92⅜	92½	0
8	7¼	8⅜	7⅛	10	do pfd. B	600	8¼	*8⅜	8¼	8¼	0
21¾	17½	24½	19	10	do bankers' sh	.....	.....	.....	.....	.....	.....
2¾	.60	3½	1¾	N.P.	Colombia Syndicate	17,000	2½	2½	2¼	2⅛	— ⅛
15	8¼	16	10	N.P.	Creole Syndicate	30,800	14¼	14¼	13¾	13¾	— ½
12¼	5	7¾	1⅝	N.P.	Crown Central	6,400	1⅞	2⅛	1⅞	1⅞	0
7	2	4	1 1/16	N.P.	Derby Oil & Ref	100	1¾	1¾	1¾	1¾	—1
27	10½	19	13	N.P.	do pfd	.....	.....	.....	.....	.....	.....
.....	.....	2¼	.60	.....	Euclid Oil	.....	.....	.....	.....	.....	.....
6	1⅜	7½	2½	N.P.	Gibson Oil	24,200	3¾	4	3¼	4	+ ⅛
3¾	1⅜	2	.63	N.P.	Gilliland v.t.c	500	1⅞	1⅛	1⅞	1⅛	+ ⅛
98½	63½	95	82	$25	Gulf Oil Corp	6,400	93¼	94⅜	93	94⅝	+1½
5⅞	2¼	4	1	N.P.	Kirby Petroleum	600	1½	1¾	1½	1¾	+ ¼
13	6	12¼	5¾	N.P.	Leonard Oil & Dev.	5,100	7½	7⅝	7¼	7¼	— ⅛
25⅞	18	25¾	20	N.P.	Lion Oil Refining	11,200	25	25¾	24⅝	25¾	— ⅛
.....	.....	46	31½	$25	Lone Star Gas	300	44⅞	44⅞	44½	44½	—1⅜
4½	1¾	3⅜	1½	N.P.	Marland of Mexico	400	2⅜	2⅜	2	2	— ¼
5¾	.56	5½	1⅞	$10	Mexican-Panuco	12,200	3⅜	3⅜	3	3⅛	— ¼
2	1	1¾	1¼	1	Mountain & Gulf	.....	.....	.....	.....	.....	.....
26¼	18¾	26	22½	10	Mountain Prod	5,600	25⅝	25¾	25⅜	25⅜	— ¼
6¾	3⅜	6¾	5	5	New Bradford	700	5¼	5¼	5¼	5¼	0
24¾	16¼	11¾	2	10	New England Fuel	.....	.....	.....	.....	.....	.....
19¾	6¼	17	9⅛	1	New Mex. & Ariz	3,300	12½	13⅛	11¾	12	— ½
12½	8¼	17	8	$5	New York Oil	200	9⅜	9⅜	9⅜	9⅜	— ⅝
37	14	36	34¼	$5	Ohio Fuel Corp	.....	.....	.....	.....	.....	.....
.....	.....	9¾	6	....	Pandem	17,700	9½	10⅛	9	9	— ½
2½	.90	2¾	.20	N.P.	Peer Oil Corp	1,000	.30	.30	.30	.30	+5
28¼	16	22¾	12	$10	Pennok Oil	500	13¾	13¾	13¾	13¾	— ⅛
44½	16	38	14⅛	$5	Red Bank Oil	.....	.....	.....	.....	.....	.....
33½	19	28¾	12	N.P.	Reiter-Foster	8,400	17½	18	16¾	16¾	— ¾
.....	.....	27½	22	$25	Richfield Oil w.i	.....	.....	.....	.....	.....	.....
9½	3½	7½	4½	N.P.	Ryan Consolidated	.....	.....	.....	.....	.....	.....
9¾	6⅛	10	7½	$10	Salt Creek Cons	1,300	7⅞	8	7⅞	8	+ ⅛
35	24	36	26⅞	10	Salt Creek Prod	5,100	31	31	30⅞	30⅞	— ⅛
3⅞	1	4	1⅜	5	Savoy Oil	100	3¼	3¼	3¼	3¼	+ ¼
13¾	9	27	7⅜	10	Tidal Osage	1,400	20½	21½	20½	21½	+1
10⅞	8	25¾	8¼	10	do non-voting	3,700	19¼	20	18⅝	20	+ ¾
.....	.....	27	20⅞	N.P.	Tide Water Assoc	5,600	22⅝	22¾	x22	22⅛	— ¾
.....	.....	99¼	95½	100	do pfd	4,700	96¾	96½	x95½	95½	— ⅞
4⅞	1¾	8	4¼	5	Venezuelan Pet	5,800	7¼	7¼	6¾	7	— ¼
.....	.....	29¾	23½	N.P.	Warner-Quinlan	900	26	26⅞	25¾	26¼	+ ¾
31¼	22⅛	36⅛	22	N.P.	Wilcox O. & G. new	1,500	27	27½	26½	27¼	+ ¼
7	3⅞	9½	4⅜	$ 1	Woodley Petroleum	200	7⅛	7¼	7⅛	7¼	— ¼

*New High †New Low xEx-Dividend.

S. O. New York Lists $400,000,000 Stock

NEW YORK, Dec. 11.—**Standard** Oil Co. of New York obtained listing on the New York Stock Exchange this week for 16,870,016 shares of $25 common stock. The total par value of this stock is $421,750,400. This is the fourth large Standard company whose stock has been listed, the others being the Standard Oil Co. of New Jersey, Standard Oil Co. of California and Atlantic Refining Co. Stock of a fifth company, the Union Tank Car Co., also is listed but this company is a tank car manufacturer and transportation organization.

It is reported that application will be made shortly to list on the stock exchange the stock of the Standard Oil Co. of Indiana. Stock in the Indiana company is now traded in on the New York Curb Market as are the stocks of all other companies except some of the operating subsidiaries, and the large companies previously mentioned.

It was also reported in financial circles that other Standard companies may list their stock if the Indiana company does.

Financial Notes

Tidal Osage Oil Co.—All outstanding bonds amounting to $1,400,000 called for redemption Feb. 1, 1927. The bonds were issued in 1921 to run 10 years. The original amount was $3,500,000.

British American Oil Co.—Special meeting of stockholders called for Dec. 15 to vote on proposal to alter capital structure by changing stock from $25 a share par value to stock of no par value and issuing four shares of new stock for each share of outstanding stock.

Standard Oil Co. of Ohio.—Report that this company would soon declare a stock dividend or increase its rate from the present 10 per cent on the common, has been denied. Rumors that such action was contemplated resulted in a rise of more than 50 points in the stock recently.

Lago Oil & Transport Co.—Report from London is that British Tankers, Ltd., will exchange its 147,892 shares of Lago stock for class B common of Pan American Petroleum & Transport Co.

Beacon Oil Co.—Control of Petrol Service Stations operating in and around New York city purchased. Tide water terminal of Craycroft Oil Co. on East river also bought.

California Petroleum Corp.—Spokane Oil & Refinery Co. with assets valued at $600,000 acquired from R. K. Neil, principal stockholder.

THE OIL INDUSTRY EXCHANGE

Positions Wanted

Highly Efficient Boiler and Plate Shop Superintendent, familiar with oil refining and gas plant equipment, is open for engagement. Box 744.

Gasoline pump, air compressor, oil and grease dispensing equipment salesman wishes to represent manufacturer producing high class equipment. Large acquaintance among oil jobbers in central states, Chicago territory especially. Thorough knowledge all types equipment. Box 747.

Salesman with 15 years experience calling on service stations and garages in Louisiana selling specialties would consider connection January 1st. Either on salary or commission. A-1 reference. Have own automobile. Post Office Box 958, Shreveport, Louisiana.

Man 40 years old, single, good personality, with 19 years experience as Division Office Accountant, Traveling Station Auditor, some tank and filling station construction work, credits and adjusting, Assistant Division Manager, and three years oil jobber for self, seeks new connection. Clear record. Address Box 743, care National Petroleum News.

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A graduate and experienced oil refinery chemist. Give reference and past experience.

Address Box 745.

OIL SALESMAN: Automobile or industrial Lubrication who is selling carloads to jobbers in New York State, Maine, New Hampshire and Pennsylvania, also West Virginia. This is a state manager position. Write in confidence salary expected, experience, age and amount of last year's sales. Appointment by mail only. Panhard Oil Corporation, 122 Greenwich Street, New York City.

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To sell on liberal commission basis to oil jobbing trade a complete line of nationally known gasoline and oil storage systems and air compressors. Your reply must state in detail lines you are now selling and exact territory you are covering.

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INDUSTRIAL LUBRICATION ENGINEER

A major oil company has an opportunity for a wide-awake, experienced lubrication engineer in their industrial oil division for New Jersey and Pennsylvania territories. Answer by letter giving full details to

Lubricating Engineer,
National Petroleum News
342 Madison Ave.
New York City

Situations Open

SALESMAN WANTED

Business getter acquainted with Michigan jobbers, to sell lubricating oils in barrels and tank cars for old established company. Give full particulars in reply.

Box 741

Business Opportunities

Partner Wanted. If you have about $10,000 to put into an established oil business from which you can net about $500 per month, let me hear from you. Would want partner to give time to business and keep simple books while I hit road for more business. This is a good chance for a live wire. For particulars write Box 746.

Patent Attorneys

INVENTORS who derive largest profits know and heed certain simple but vital facts before applying for patents. Our book Patent-Sense gives those facts: free. Write Lacey & Lacey, 679 F St., Washington, D. C. Established 1869.

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with differential and static records on same chart. Capacity 50 inches water and 250 lb. pressure. Must be in good condition.

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Miscellaneous

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ADVERTISERS INDEX

National Petroleum News

Adamson Mfg. Co.
Alcorn Combustion Co.
Allison Coupon Co.
Aluminum Company of America.
American Bridge Co.
American Can Co.
American Oil Corp.
American Oil Pump & Tank Co. 97
American Radiator Co. 95
American Schaeffer & Budenberg Corp.
American Steel Package Co 90
American Telephone and Telegraph Co.
Associated Business Papers, Inc.
Association of Natural Gasoline Mfg.
Autocar Co 116
Automobile Rotary Lift Co.

Barnickel & Co., Wm. S. 109
Barnsdall Refg. Co.
Battenfeld Grease & Oil Co.
Bell Oil & Gas Co.
Benjamin Electric Mfg. Co.
Bennett Pumps Corp
Bessemer Gas Engine Co. 40
Bethlehem Steel Co. 48
Birmingham Machine & Foundry Co. 108
Blackmer Pump Co.
Blaw-Knox Co.
Boe Mfg. Co.
Bowser & Co., Inc., S. F.
Braun & Co., C. F.
Brookins Mfg. Co.
Brown Sheet Iron & Steel Co. 87
Buckeye Boiler Co.
Buckeye Iron & Brass Works. 6
Budd Wheel Co.
Buffalo Meter Co. 96
Burrell Co., Geo. A.
Butler Mfg. Co.

Cameron, A. S. Steam Pump Works. (Ingersoll-Rand Company)
Campbell, J. A.
Canfield Oil Co., Cleveland.
Central Commercial Co.
Champion Pneumatic Mach. Co. 64
Champlin Refining Co.
Chapman Valve Mfg. Co.
Chestnut & Smith Corp. 15
Chicago Bridge & Iron Works.
Chicago Nipple Mfg. Co.
Chicago Tubing & Braiding Co.
Cincinnati Advertising Products Co.
Clark Co., Fred G.
Classified Advertising Section. 127
Cleveland Steel Barrel Co.
Columbian Steel Tank Co.
Continental Ref. Co.
Continental Supply Co. 78
Correct Measure Co.
Crane Co 91
Crown Central Petroleum Corp.
Crystal Oil Refg. Corp.
Curtis Pneumatic Machinery Co.

Dale Oil & Refg. Co.
Damascus Manufacturing Corp.
Davis Welding & Mfg. Co. Inside Back Cover
Dayton Air Compressor.
Dayton Pump & Mfg. Co.
Deepwater Oil Refineries.
Dempster Mill Mfg. Co.
Derby Oil & Refg. Corp., The.
Des Moines Foundry & Machine Co.
Draper Mfg. Co
Dunning Compressor Co.
Dunn Painting Machine Co.
Du Pont de Nemours & Co. E. I.

Economy Engineering Co.
Edwards Mfg. Co.
Edward Valve & Mfg. Co. 87
Emerson-Scheuring Tank Co.
Empire Oil Works, Inc. 96
Empire Refineries, Inc 13
Erie Service Station Equipment Co.
Ethyl Gasoline Corp. 106

Fairbanks, Morse Co.
Farrell Mfg. Co.
Fiske Bros. Refg. Co.
Flexlume Corp.
Foamite-Childs Corp.
Fogarty Mfg. Co., The.
Freedom Oil Works.
Frontier Mfg. Co. 107

Gasoline Register Co.
General American Tank Car Corp. 87
General Motors Truck Co.
Gilbert & Barker Mfg. Co. 2
Globe Mfg. Co.
Globe Oil & Refg. Co.
Gomory, W. L.
Goodrich Rubber Co., B. F.
Graham Brothers.
Graver Corp. 114
Gray Processes Corp.
Groetken Pump Co.
Guarantee Liquid Measure Co. 110
Gulf Ref. Co. 80

Handy Oiler Co.
Hartol Products Corp.
Heil Co., The 11
Hiergesell Brothers.
Highland Body Mfg. Co.
Hope Engineering & Supply Co.
Hornblower & Weeks.
Hughes Tool Co 74
Humble Oil & Refining Co.
Huntley & Huntley
Hurt Engineering Corp., G. F. 45

Illinois Glass Co.
Imperial Oil Marketing Co.
Independent Oil & Gas Co. 8
India Tire & Rubber Co. 3
Ingersoll-Rand Co
(A. S. Cameron Steam Pump Works)
International Harvester Co.
Iowa Park Producing & Refg. Co.
Irving-Iron Works Co.
Island Petroleum Co.

Jenkins Bros.
Johns-Manville Co., H. W.
Johnson Fare Box Co.

Kanotex Ref. Co.
Kewanee Safe Co.
Keen & Woolf Oil Co. 104
Kellogg Co., M. W.
Kellogg Mfg. Co.
Kelly-Springfield Tire Co. 14
Kelly-Springfield Truck & Bus Corp.
Keystone Oil & Mfg. Co.

Lancaster Iron Works, Inc.
Larkin Automotive Parts Co.
Leader Iron Works
Linde Air Products Co.
Litchfield Corp
Louisiana Oil Refg. Co.
Lubricating Appliance Mfg. Co. Inc.
Luce Trunk Co. 109
Lucey Mfg. Co 77
Ludlow Valve Mfg. Co. 48
Lummus Co. The Walter E.

Marco Light & Power Corp.
Marland Refg. Co.
Mars Co.
Marvel Equipment Co. 111
Mathieson Alkali Works Inc.
McDonald Mfg. Co., A. Y. 98
McKee & Co., Arthur G.
Merco Nordstrom Valve Co. 65
Merriam Co., C. & G.
Merit Oil Equipment Co.
Metal Hose & Tubing Co.
Metal Shelter Co
Metric Metal Works. 16
Meyercord Co.
Miller & Co., Inc. Max B.
Miller Sons Co., A. D.
Milwaukee Tank Works.
Mohawk Rubber Co.
Moore & Kling, Inc.
Morrison Bros.

National Carbon Co., Inc.
National Oil Products Co. 80
National Petroleum Marketers Assn.
National Petroleum News. 4-12
National Recording Pump Co.
National Refining Co.
National Tank Auditing Service, Inc.
National Transit Pump & Machine Co. 48
Neil & Co. Wm.
New York Lubricating Oil Co. 50
North American Car Corp.

Ohio Traffic Devices Co.
Ohmer Fare Register Co.
Oil Conservation Engineering Co.
Oil Well Supply Co.
Oxweld Acetylene Co.

Page Steel & Wire Co. 79
Pease Co., C. F.
Peerless Stove & Mfg. Co.
Pennsylvania Flexible Metallic Tubing Co.
Pennsylvania Refg. Co 58
Petroleum Iron Works Co. 5
Petroleum Oils Corp 86
Pforzheimer & Co., Carl H.
Phillips Petroleum Co.
Pittsburgh-Des Moines Steel Co.
Pittsburgh Gasoline Pump Co.
Pittsburgh Machine Tool Co
Pittsburgh Pipe Coil & Bending Co. 90
Platt Co., W. C. 118
Power Specialty Co.
Pressed Steel Tank Co. 9
Prest-O-Lite Co.
Producers & Refiners Corp. 93
Professional Card Section.
Pure Oil Co.
Pyrene Mfg. Co.

Quaker State Oil Refg. Co.
Quincy Compressor Co. 103

Ranney Oil Mining Co.
Rand McNally & Co. 105
Reading Steel Castings Co., Inc. 58
Rhodes Co., Jay B.
Robertson Steel & Iron Co. W. P. 102
Roper Corp., Geo. D.
Roxana Petroleum Corp. 1

St. Louis Can Co. 10
St. Louis Steel Package Co.
Safety Lift Co. 49
Schaeffer Bros. & Powell Mfg. Co.
Selden Truck Corp.
Service Station Equip. Co.
Sharpsville Boiler Works Co.
Shepard Corp., Arthur B. 106
Shotwell Pump & Tank Co.
Sinclair Refining Co. 112
Sistersville Tank & Boiler Works.
Skelly Oil Co. 48G-48H-48I
Smith Corp., A. O. 71
Sowers Mfg. Co.
Spencer Petroleum Co.
Standard Boiler & Plate Iron.
Steel Drum Accessories Corp.
Steiner Oil Co.
Streett & Co., Inc. J. D.
Suender, W. Frederick.
Sun Oil Company. 81

Tagliabue Mfg. Co., C. J.
Texas Company, The. 82-83
Texas Pacific Coal & Oil Co.
Tide Water Oil Co.
Tokheim Oil Tank & Pump Co. 68
Transcontinental Oil Co. 7
Truscon Steel Co.

Union Metal Mfg. Co. 85
Union Tank Car Co.
United Filters Corp. 79
U. S. Air Compressor Co. Inside Front Cover
United States Can Co., The.
United States Cast Iron Pipe & Foundry Co. 47
Universal Oil Products Co. 39

Van Tine, C. C.
Viking Pump Co.
Vilter Mfg. Co.
Vogt Machine Co., Henry. 88
Volcker Mfg. Co.

Wackman Welded Ware Co.
Walburn Petroleum Co., Inc.
Waverly Oil Works. 61
Wayne Co. Outside Bock Cover
Westcott & Greis, Inc.
Western Steel Corp.
Wheaton Brass Works, A. W. 88
Wheeling Steel Corp.
White Company.
White Eagle Oil & Refg. Co.
Widdell Engineering Co., Inc.
Williams Sealing Corp.
Wilsey Tuthill Pump.
Wilson Welder & Metals Co., Inc. 43

Youngstown Boiler & Tank Co. 101
Youngstown Welding Co., The.